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PC WORLD

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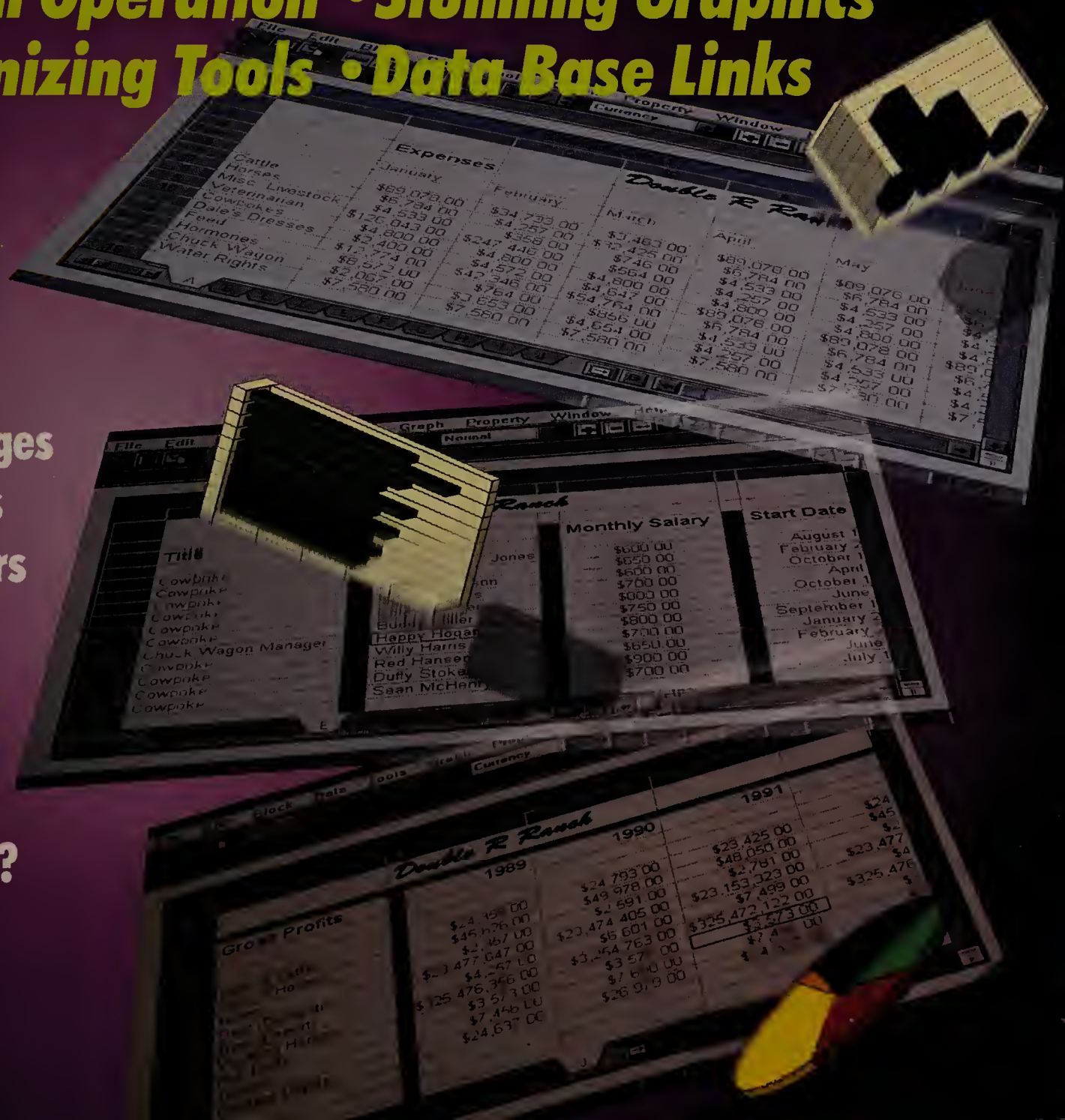

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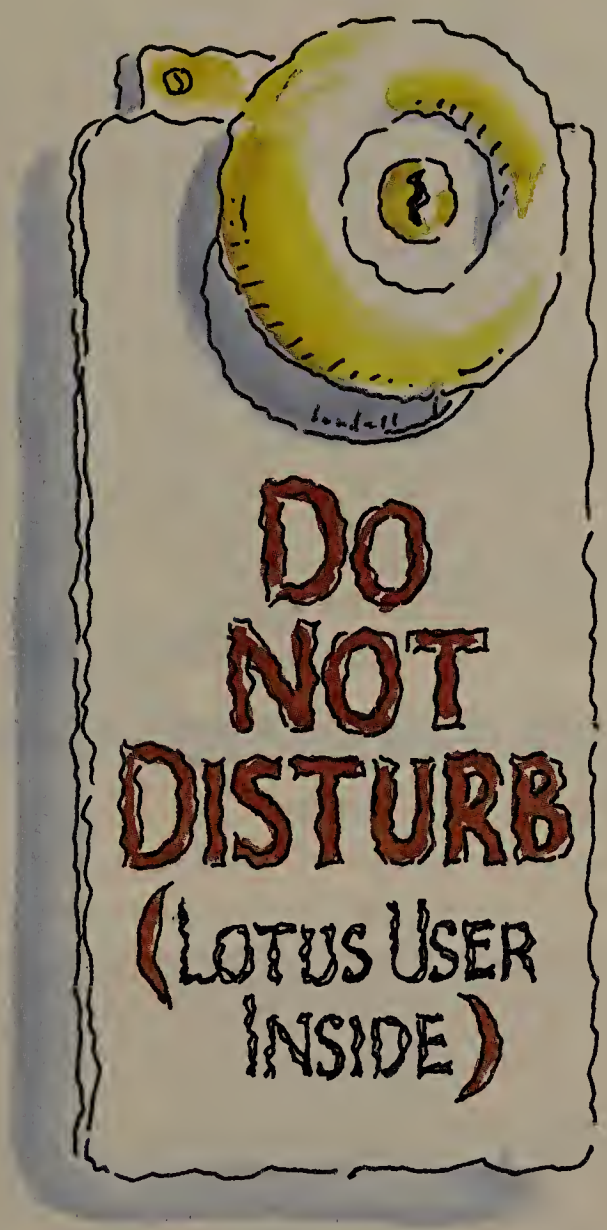
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Unless, of course, new Microsoft Excel 4.0 for Windows and promotions and the big bucks and a corner office appeal to you.

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Introducing Microsoft® Excel 4.0 for Windows.™ It's the spreadsheet that makes your everyday number-crunching tasks, not to mention more complex things, easier than you ever thought possible.

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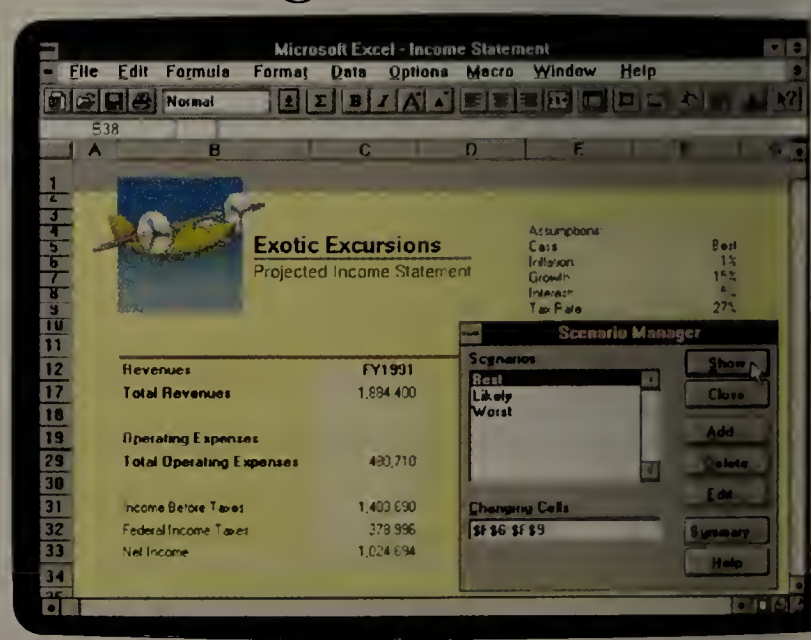
Shortcut menus are another innovation: when you click the right mouse button, a



The Scenario Manager is a powerful analysis tool. In a matter of minutes, you can easily create and save multiple "what if" scenarios, then instantly produce nice-looking summary reports. (Which makes you look nice, too.)

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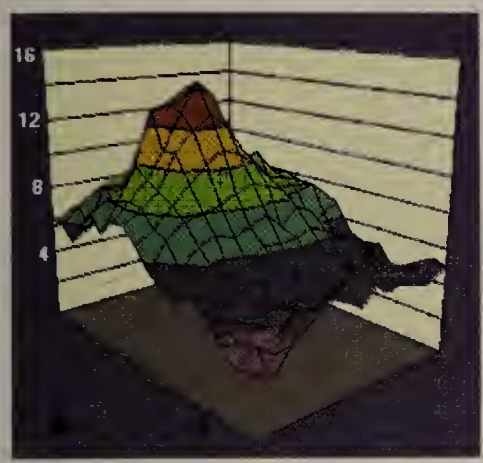
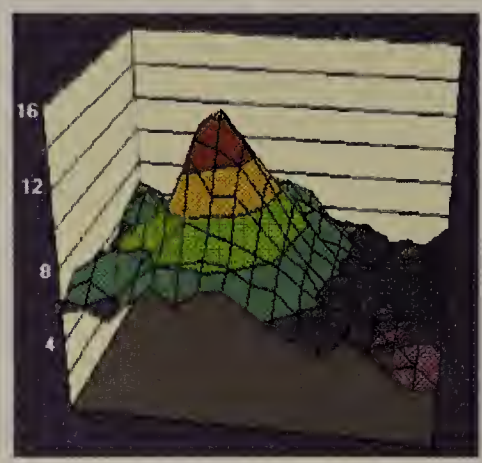
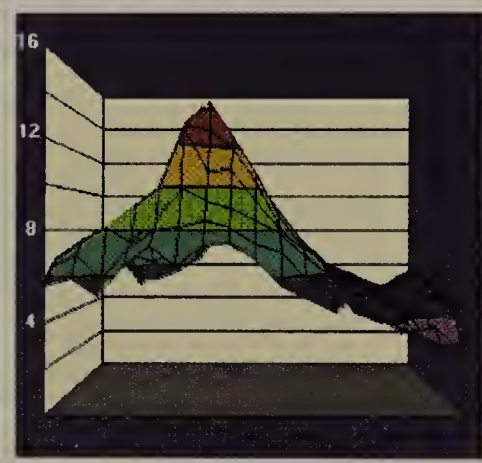
menu appears on-screen next to whatever you're doing, offering you all the options that sensibly relate to the task at hand.

And Wizards are step-by-step guides that take you through complex tasks, like charting, or creating summary tables from a database.







The gallery of 90 chart types includes rotating 3-D charts, along with surface, radar and picture charts. It looks great here. It's even more impressive on your screen.

With new Drag and Drop, you highlight the area you want to move, "grab" it with your cursor, and drag and drop it to wherever you want it. It's that simple.

We've also made the Toolbar customizable. Plus, it has handy new features like a Spelling Checker and AutoCenter, which lets you center text over multiple columns with one mouse click. Talk about easy.

Invested a lot of time in Lotus®? No problem. You can learn using what you know. Type in your familiar Lotus 1-2-3® commands, and Microsoft Excel shows you the equivalent commands. [illegible]

get work done even while you're learning, which makes for a virtually seamless transition.

Microsoft Excel also reads and writes all your Lotus files. And it runs your macros – unmodified.

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In short, just think of new Microsoft Excel 4.0 for Windows as the ultimate refinement of one-step-power-with-ease.

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Wondering how to upgrade? Check out the caption underneath the guy on the left – if you're interested in the best spreadsheet on the planet, that is.**

Otherwise, just try to forget you ever saw this.

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JULY 1992
VOLUME 10
NUMBER 7

PC WORLD

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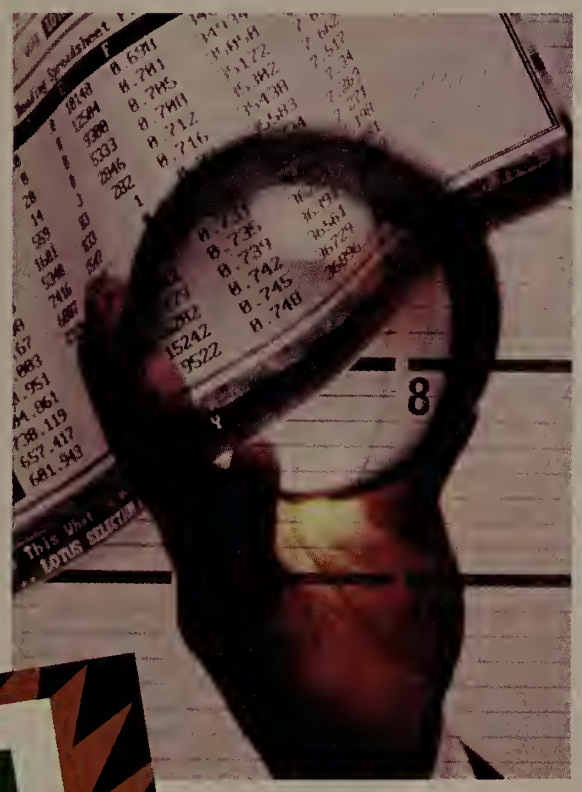

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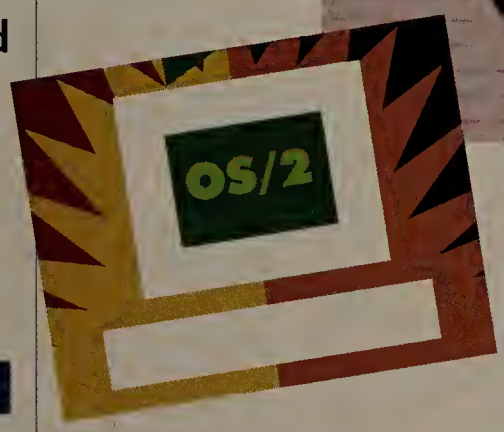

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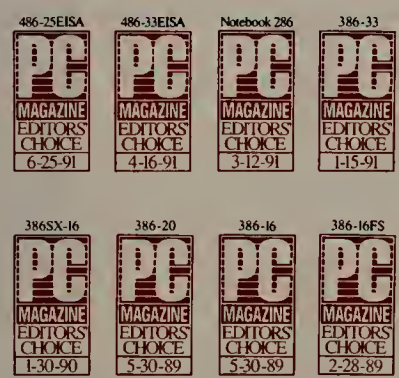

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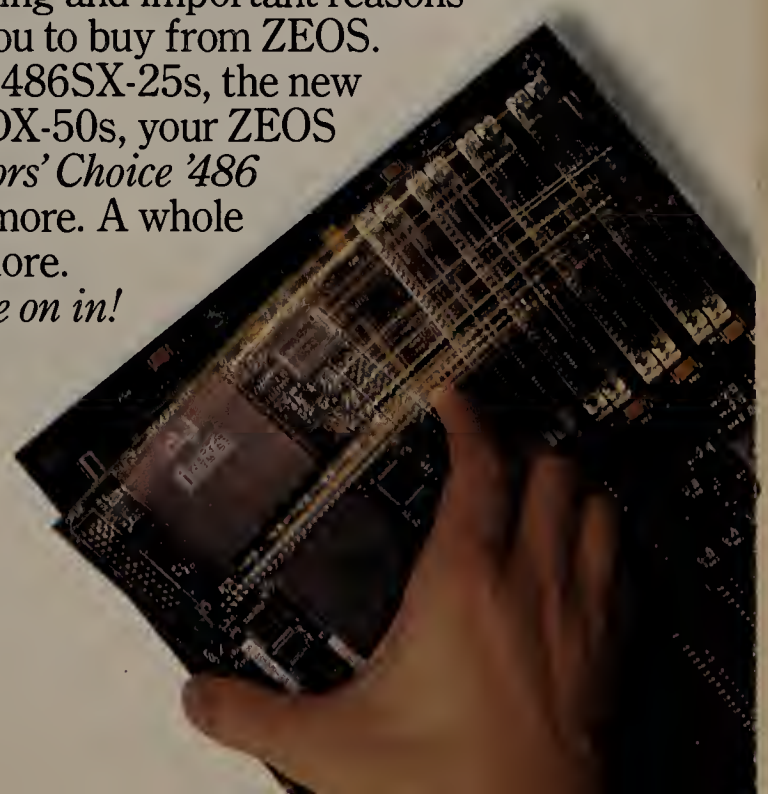
And all of this is just for starters. Because when you turn the page we're going to talk about a lot of other very exciting and important reasons for you to buy from ZEOS. Like 486SX-25s, the new 486DX-50s, your ZEOS *Editors' Choice '486* and more. A whole lot more. *Come on in!*



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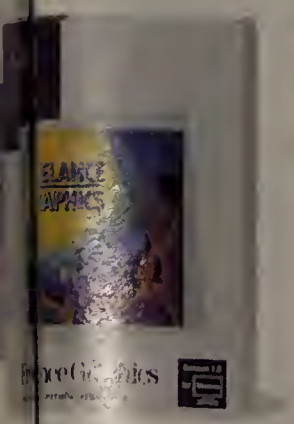

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PC World encourages readers to share technical solutions. We pay $25 for each *Power Tip* published in the magazine, $50 for *User Group Tips,* $25 to $200 for *Star-Dot-Star* items, and $50 for questions used in the How To section. Keep submissions brief (*Power Tips* and *User Group Tips* to 100 words or less). We cannot acknowledge unpublished submissions; accepted submissions will be acknowledged by payment.

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Send hardware and software press releases to John Goddard or call 415/978-3212.

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The **Flyer 32LCT** gives you the expandability you'd expect to find in a full-featured tower system at the type of price you'd expect to pay for a desktop PC.

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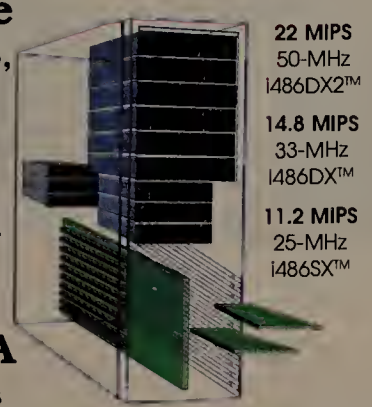

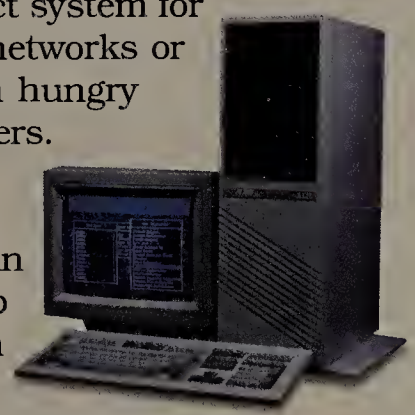

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intel inside

Model	PowerFlex FLYER	Flyer 32 DT	Flyer 32 LCT
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upgrades to	i486SX/20	i486SX/25	i486DX/33
		i486DX/33	i486DX2/50
		i486DX2/50	
Memory Arch.	16-bit	32-bit	32-bit
Standard RAM	1-MB	4-MB	4- or 8-MB
Maximum RAM	16-MB	36-MB	64-MB
Memory Cache	8-KB int. (i486SX only)	8-KB int.	8-KB int.
Optional Cache		256-KB (Std. on DX2/50 Models)	256-KB
Expansion Slots	3 ISA	3 ISA	10 ISA
Standard HDrive	60/80-MB	0/80/120/200-MB	0/120/340/535-MB
Drive Bays	3	3	12
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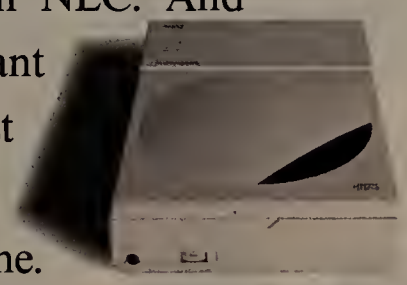

Looks like someone just discovered CD-ROM with MultiSpin.™

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Free While Quantities Last

Which data compression product?

Authorized Test Report

Software Digest

RATINGS REPORT®

The Independent Comparative Ratings Report for Selecting IBM PC Business Software

Volume 8, Number 16

ON THE FLY COMPRESSION PROGRAMS

On the fly compression programs compress and decompress data being transferred to and from storage. This provides twice as much effective space on any given storage device.

- The overview explains the operation of these programs and focuses on data loss or data corruption. NSTL highlights inherent problems with these programs as well as glitches and bugs uncovered during testing.
- Performance testing measures compression ratios achieved on a wide variety of data files. Executables, spreadsheets, text, graphics, fonts, archives, database, and Postscript files test each program for compression ratio and speed. All performance tests run on 386SX 16MHz and 486 33MHz machines. NSTL measures the amount of conventional or upper memory block memory needed by each program.

Software Digest Rating	Overall Evaluation	Overall Power	Program Name	Version Tested	Performance	Versatility	Error Handling	Ease of Learning	Ease of Use	Memory Requirement	Price	Volume Purchase Agreements	Page
✔ ★★★★★	9.3	9.7	Stacker AT/16	2.0	■	■	■	■	■	512K	$249	✔	24
✔ ★★★★	8.6	8.6	Stacker	2.0	■	■	■	■	■	512K	$149	✔	22
★★★	7.1	6.6	Expanz! Plus	2.1	■	■	■	■	■	512K	$199	✔	20
★★	6.7	7.5	SuperStor	1.3G	■	■				640K	$139	✔	26
★	5.9	5.4	Double Disk	2.5	■	■	■	■		512K	$100	✔	18

Ratings Key
(On a scale of 0 to 10)
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★★★★ 8.0-8.9
★★★ 7.0-7.9
★★ 6.0-6.9
★ 5.0-5.9
ALL OTHER RATI
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Circle 271 on reader service card

. . . and Quattro Pro Makes Three

This is the third time within a year that Richard Scoville, contributing editor and celebrated spreadsheet guru, has appeared on this page with spreadsheet screens floating around his head. The third time in this case is more than a charm—it's a minor historic event. With the arrival of *Quattro Pro for Windows,* all the major spreadsheets now run under *Windows;* and Scoville has been our front-line reporter and beta tester for each one.

On this occasion we'll skip the usual paean to the virtues of *Windows.* Many of you have written complaining that *PC World* reads like an advertisement for the W word, and with some justification. Instead of focusing on the environment this time, let's talk about its best applications. As Scoville's cover story attests, *Quattro Pro*'s migration demonstrates that for better or worse, the latest *Windows* apps are among the best ever to find their way onto a hard disk.

Quattro Pro for Windows, Excel, and *1-2-3 for Windows* each has its special strengths. What they have in common is simplicity: Operations that would necessitate a long string of commands or a flurry of menus in a DOS product are reduced to a few mouse moves and clicks.

Quattro Pro's unique advantage lies in the way it organizes worksheets. *Excel* has its clever "workbooks" for holding related worksheets, and *1-2-3 for Windows* builds on its DOS sibling's 3-D organization. *Quattro Pro for Windows* marries the best of both worlds, applying a notebook metaphor—with "tabs" that let you flip among worksheet pages—to a 3-D structure that offers all the power of cross-worksheet ranges and one-button consolidation.

Stretching *Windows* conventions, Borland has also upped *Quattro Pro for Windows'* mousepower by making the right button as useful as the left. Borland believes that directly manipulating "objects"—worksheets, ranges, headings, and so on—is the most natural and productive way to compute. The right button in *Quattro Pro for Windows* becomes a device to engage in what Borland calls "property inspection," so if you right-click on an object such as a title bar, you get a dialog box that lists all the options specific to that object.

Microsoft provided a kind of property inspection in *Excel 4.0,* albeit without the consistency or elegance of Borland's implementation. All in all, it's not surprising that *Excel*—in its fourth iteration and holding what some might call an unfair advantage, coming as it does from the company that created the environment—leads in some areas, such as a greater abundance of formatting, what-if, and statistical features.

But as Scoville notes, people should base their long-term buying decisions on a program's fundamental structure, not on the latest features list. *Quattro Pro for Windows* not only has an appealing interface and a special talent for organizing worksheets, its graphics module is unsurpassed and—perhaps most significant in a networked environment—it can integrate seamlessly with Borland's two data base titans, *dBASE IV* and *Paradox.* Not bad for a 1.0 version. If you like the way today's *Quattro Pro for Windows* looks and feels, go for it. You can be sure that in a competitive environment this hot, the next version will redress any omissions and introduce innovations that its rivals will be dying to copy.

As we bring you the good news about the win-win situation in spreadsheets, we've got a similarly rosy story to tell in this July's huge special section on utilities. This month you'll find

Spreadsheet visionary Richard Scoville contemplates Quattro Pro for Windows' three dimensions.

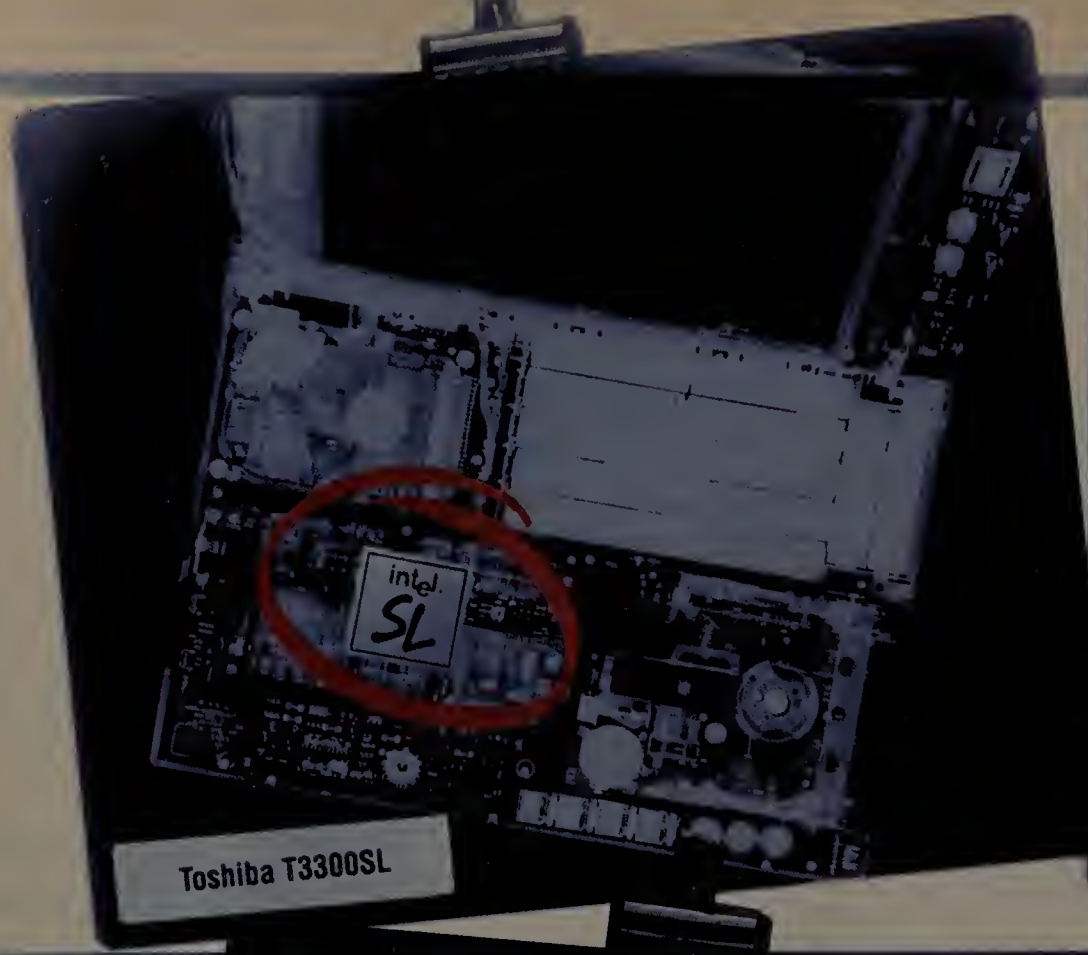
WALTER CALLAHAN

no fewer than 100 little software gems, from *The Norton Utilities* to *Windows* shareware. Unlike $495 spreadsheets, most of these packages fall in the category of impulse buys.

Seasoned *PC World* readers will probably want to turn directly to "The Experts' Favorites," where our How To columnists reveal the software tools they can't live without. Find out which DOS utility protected *Help Screen* editor Robert Lauriston from Michelangelo, how *Home Office* author Steve Bass dupes disks in the wink of an eye, and why *Word Processing Clinic* author George Campbell ranks a low-cost CD ROM application as one of his best-loved utilities. With this many cheap and useful products floating around, it's tough to go wrong.

Eric Knorr

ERIC KNORR
EDITOR



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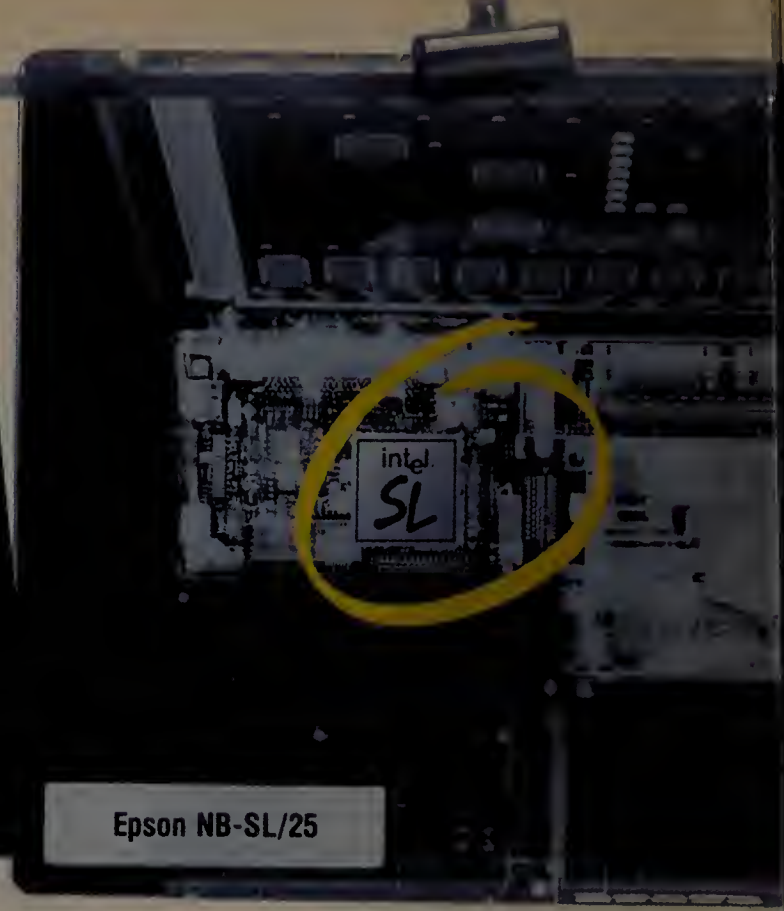

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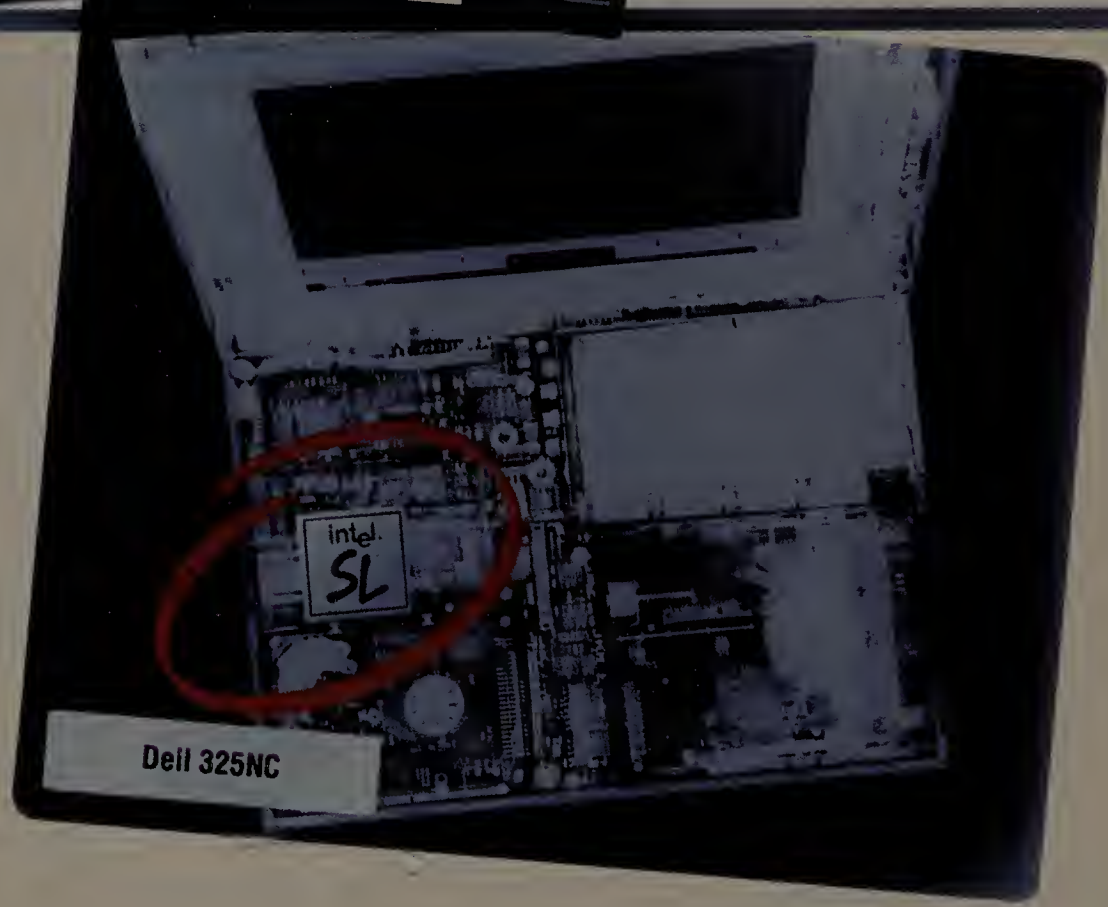

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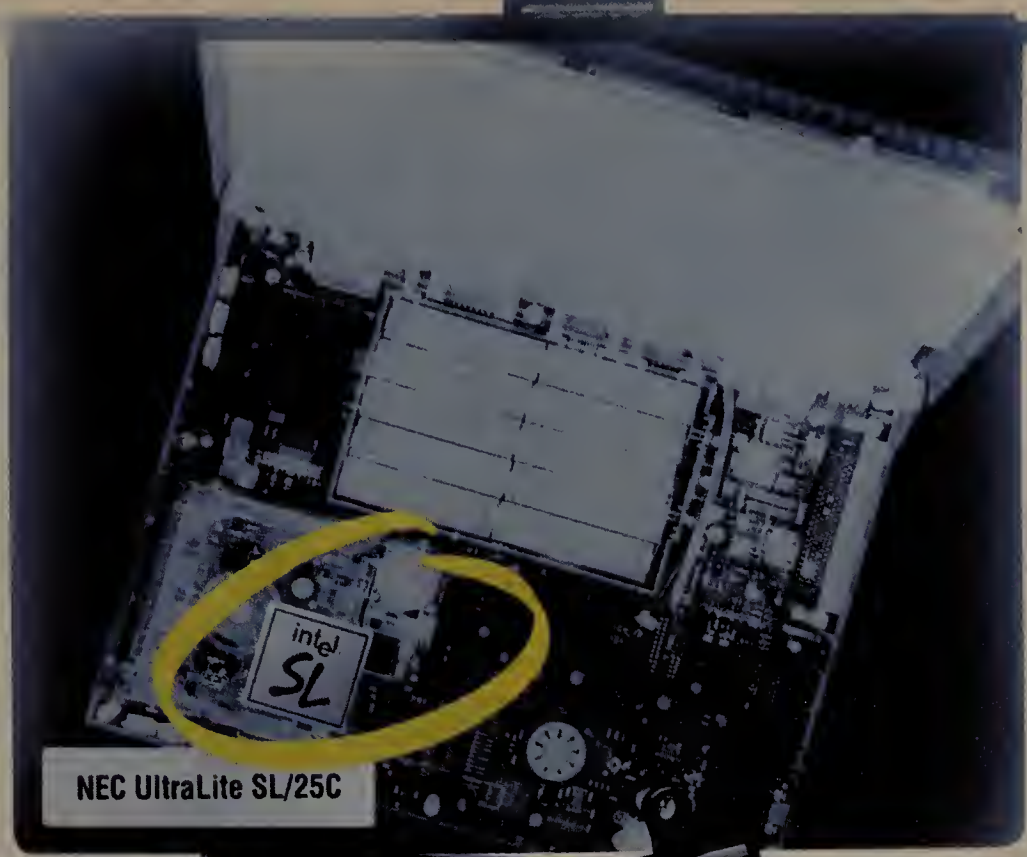

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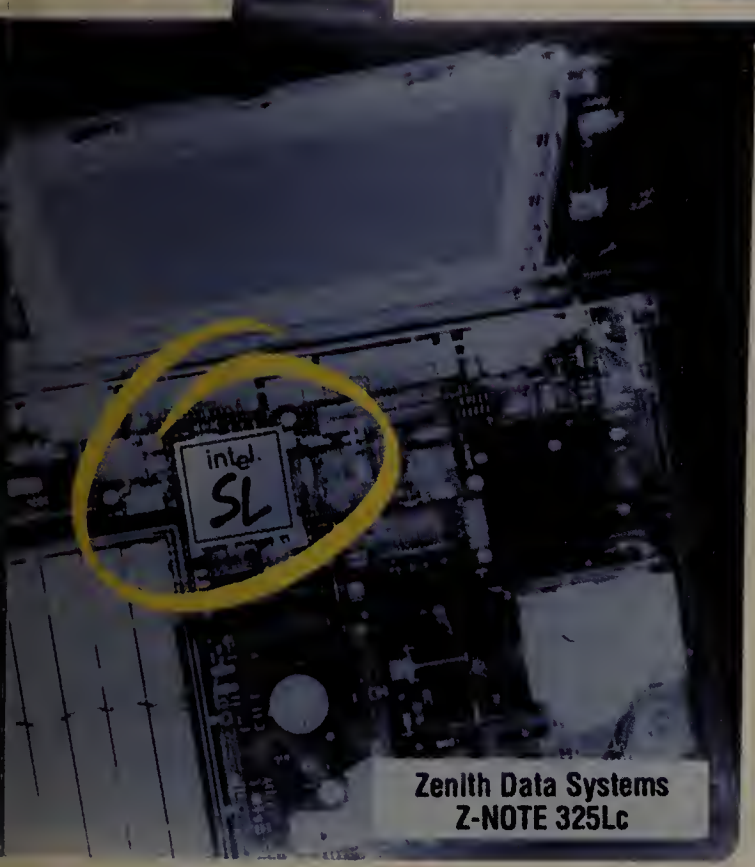

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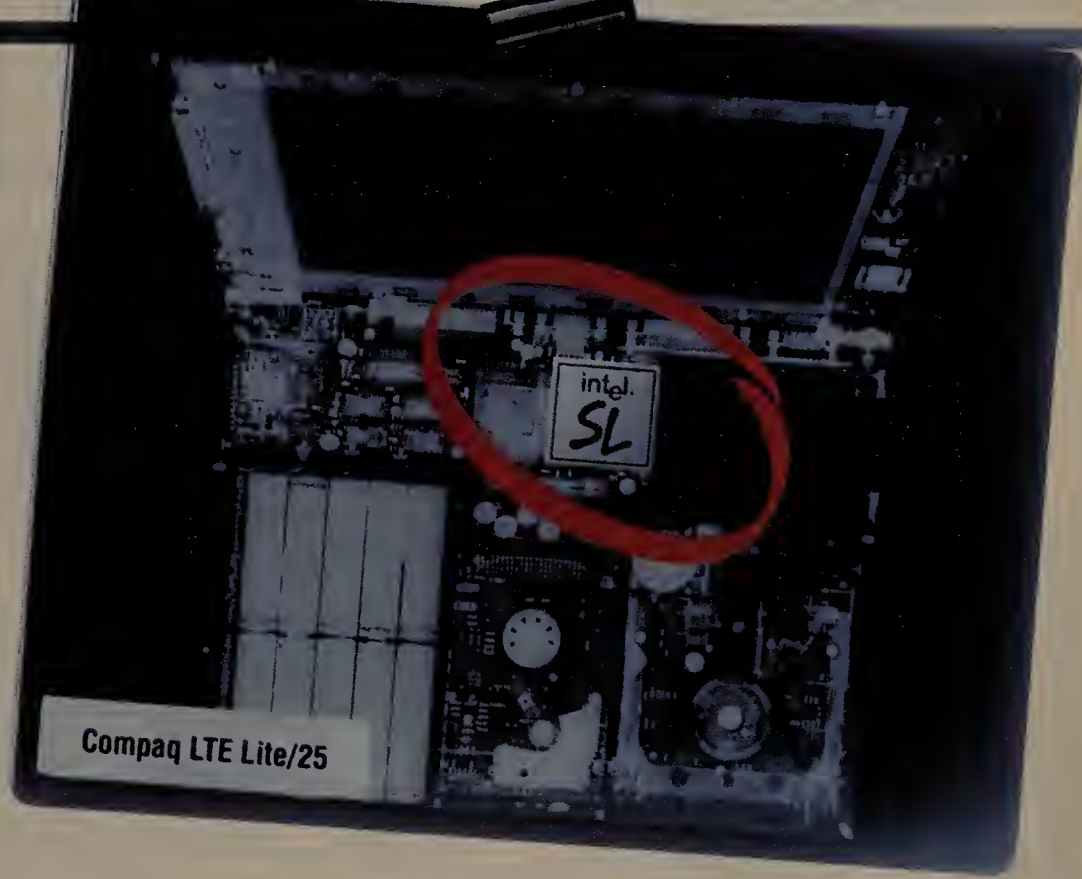

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Circle 107 on reader service card

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HP LaserJet Printers.

HEWLETT PACKARD

*Suggested U.S. list prices.

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LETTERS

Reactions and responses from the PC World community

A Politically Correct World

I was surprised that George Campbell, in the otherwise sensible April "Windows Word Processors," faulted several programs for their "extremely sexist" thesauri. It hardly makes sense to fault the makers of word processors for using Merriam-Webster, a best-selling thesaurus. Can a thesaurus—which claims only to reflect usage, not dictate it—be considered sexist? More fundamentally, don't readers prefer objective product reviews, free from politically correct jargon? Perhaps Mr. Campbell has simply misinterpreted the *PC* in the title of your magazine.

JONATHAN BALSAM
LAWRENCE, NEW YORK

Word processor publishers can choose among several thesauri. If a thesaurus reflects usage, limiting the synonyms for woman *to* mistress, girlfriend, lover, *and the like certainly does not reflect the breadth of contemporary usage. While this may not disturb you, it certainly does disturb others and is worthy of mention. —George Campbell*

Out the Window

Congratulations for publishing Mike Hogan's commentary on *Windows* in *What Next?* [April]. It's about time a major publication had the courage to tell it like it is—or at least let a columnist express his opinion—about that hound dog of a program. Aside from the fact that I'm not afraid of a C> prompt, I regard *Windows* as a bloated, lame hippo (although it certainly is prettier).

GEOFFREY C. CHAPMAN
BLACKSBURG, VIRGINIA

ANTHONY RUSSO

Death and Taxes

The April article "Buyers' Guide: Mail-Order 386 Systems" provided valuable suggestions for consumers. There is one item, however, with which I must take issue. The mail-order checklist states, "If you're purchasing from a company located outside the state to which the unit is being shipped, you should not be charged sales tax." This statement is inaccurate. In some cases a sales or use tax may apply. Further, the

ANDREW SHACHAT

law is unclear in this area, and some companies may collect sales tax to resolve that uncertainty and avoid claims by a particular state seeking taxes as well as penalties.

The U.S. Supreme Court is currently considering the constitutionality of a North Dakota statute requiring out-of-state mail-order companies to collect use taxes for products sold to North Dakota residents. That decision could provide a precedent that will result in most states charging use taxes.

ARTHUR B. LAZERE
CHAIR
NORTHGATE COMPUTER CORPORATION

In 1967 the Supreme Court made clear, by its decision in the Bellas Hess *case, that it is unconstitutional for a state to impose responsibility for collecting sales tax on a mail-order company whose only contact with the taxing state is through the mail. However, most states do attempt to impose this responsibility on mail-order companies, and the Supreme Court is now considering whether to reverse* Bellas Hess *in the context of North Dakota's tax statute. Until* Bellas Hess *is reversed, though, many authorities are of the opinion that mail-order companies with no presence in the state can constitutionally refuse to collect sales or use taxes for that state. —Ed.*

What's a Street Price?

I have been comparing prices with the intention of purchasing a 386DX computer in the near future. I've appreciated your recent articles discussing various hardware components and systems. But prices offered by local vendors for 386DX systems are a great deal less than the street prices you list for systems you've reviewed. What gives?

JOHN SHELDON
ARLINGTON, VIRGINIA

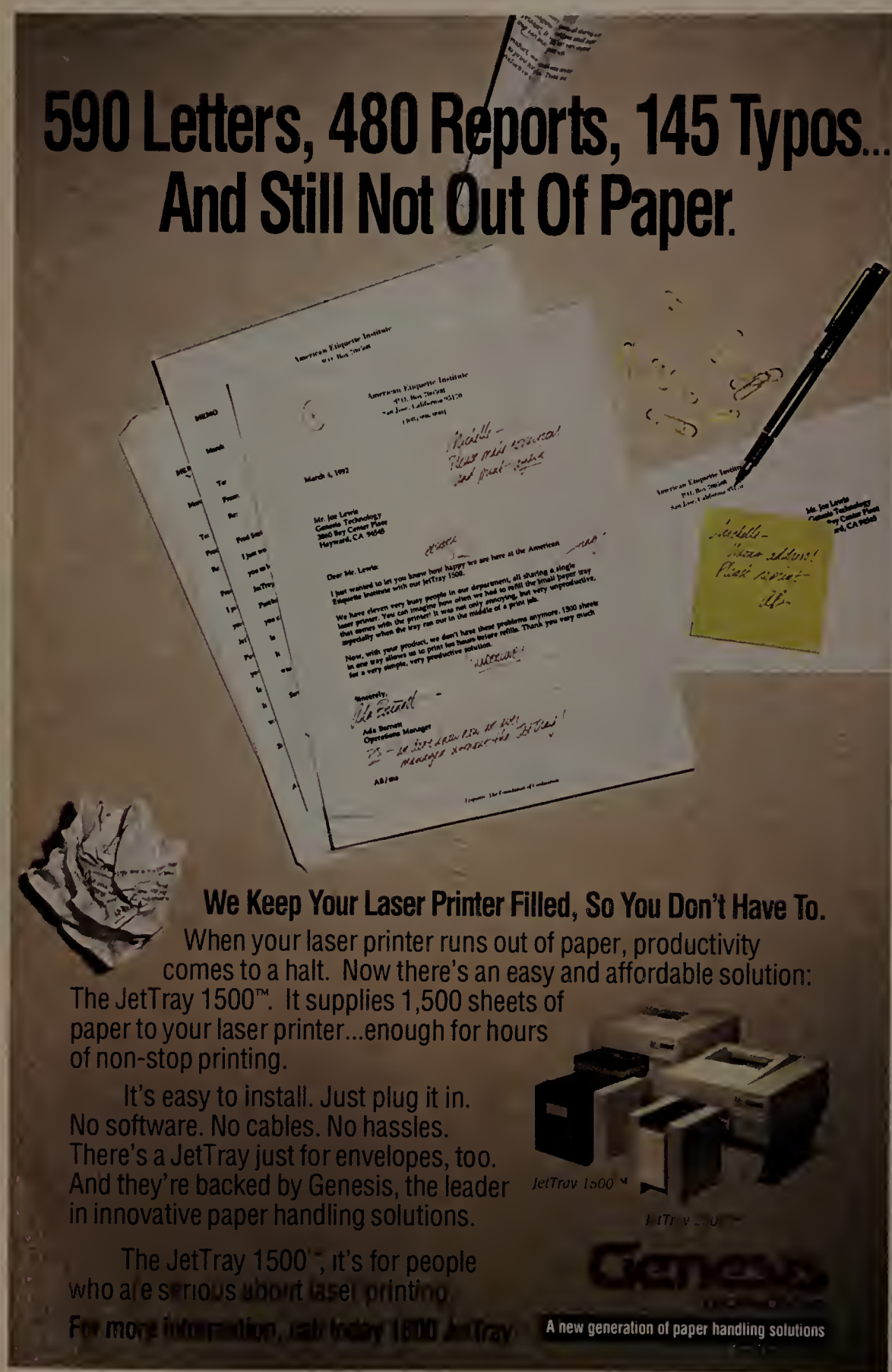
Because prices vary so widely throughout the country and from dealer to dealer, we call 24 dealers (3 in each of 8 major cities) and ask them to quote us a price on the fully equipped systems we're reviewing. We then take an average of those prices to determine our street prices. Also, due to the fast pace of this industry, prices may change by the time the magazine hits the streets.

They are intended as a guide, not an absolute price. —Ed.

A Bigger Crapshoot

Scott Spanbauer's comparison of MS-DOS 5.0 and DR DOS 6.0 in April ["DOS vs DOS"] describes the choice between the two as the "crapshoot of the nineties," but I believe he misses the real action. *Windows* is slow, unreliable, hardware intensive, bound up in a copyright infringement suit, and tied to a limited, aging operating system at an evolutionary dead end. The big crapshoot is deciding which of the viable alternative operating systems to jump to, OS/2 or UNIX.

ED HILLER
LITTLE ROCK, ARKANSAS



Circle 136 on reader service card

Totally Fast Board

I received my March issue of *PC World* on March 5, read TJ Byers' review "Fast Video Boards for Windows," and ordered the Best Buy—the Aamazing VGA700 video board—on March 6. It arrived on March 11 and installed quicker than I could type "COPY README PRN." Your review was right on target. Thank you for not assuming every *Windows* user has a bottomless wallet and can afford to pay a huge sum for a video board. My system now runs the way I first envisioned it—faster than my mouse and I.

WAYNE YANCEY
KAILUA, HAWAII

Led Astray

When I purchase software, I rely heavily on the evaluations made by what I used to consider reliable computer industry publications. I am currently considering purchasing remote-control software so I can operate my office computer from home. I had succeeded in narrowing my choices down to either *Close-Up* or *pcAnywhere*. After reading "Remote Communications Software: The Next Best Thing" in the February *PC World*, I was leaning toward *Close-Up*. Then when I read a similar article in the March 2, 1992, issue of *InfoWorld*, I became thoroughly confused. *InfoWorld*'s review was 180 degrees out of phase with *PC World*'s. How can two reputable, ostensibly reliable publications test products and come up with such opposing results?

HOWARD ATLAS
MASSAPEQUA PARK, NEW YORK

PC World *and* InfoWorld *were not evaluating the same version of* pcAnywhere *in these two reviews.* PC World *compared* pcAnywhere 4.03c *with* Close-Up Dual Pack 4.0, *while* InfoWorld *compared version 4.5 of* pcAnywhere *with* Close-Up Dual Pack 4.0. *When* PC World *went to press, Symantec had not yet released* pcAnywhere 4.5. InfoWorld *is a weekly magazine without time-consuming newsstand distribution, so its review went to press later. —Ed.*

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*When available

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The Wor

Introducing New CA-Textor. The Friendliest,

Have you heard?

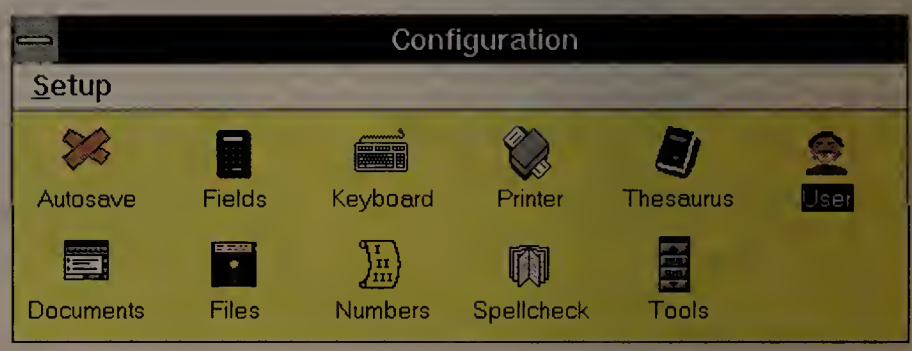
Everybody is talking about new CA-Textor™ For Windows, the first and only word processor that makes writing almost as easy as talking.

You'll have CA-Textor up and running in seconds. And thanks to its graphical, easy-to-use design, you'll be adding more power and persuasion to memos, letters, briefs and reports almost instantly–all with just a few clicks of the mouse.

You can write and edit documents in standard, draft or WYSIWYG modes. (WYSIWYG means "What You See Is What You Get." Get it?)

You'll be amazed at how simple it is to make your work look spectacular.

That's because CA-Textor supports over 300 different fonts, plus a full array of type styles and colors. You'll quickly discover that changing the way your words look on screen and on paper is really almost as easy as changing your mind.



CA-Textor's friendly, graphical design helps you work smarter than ever with just a few clicks of the mouse.

But that's not all.

Creating and modifying tables is a breeze with CA-Textor's powerful table editor and dynamic calculation cells.

Work on multiple documents at the same time with its advanced MDI interface.

Or insert pictures for added impact, including CGM, TIFF, WMF, WPG and BMP file formats.

And if you don't know what those mean, don't worry about it.

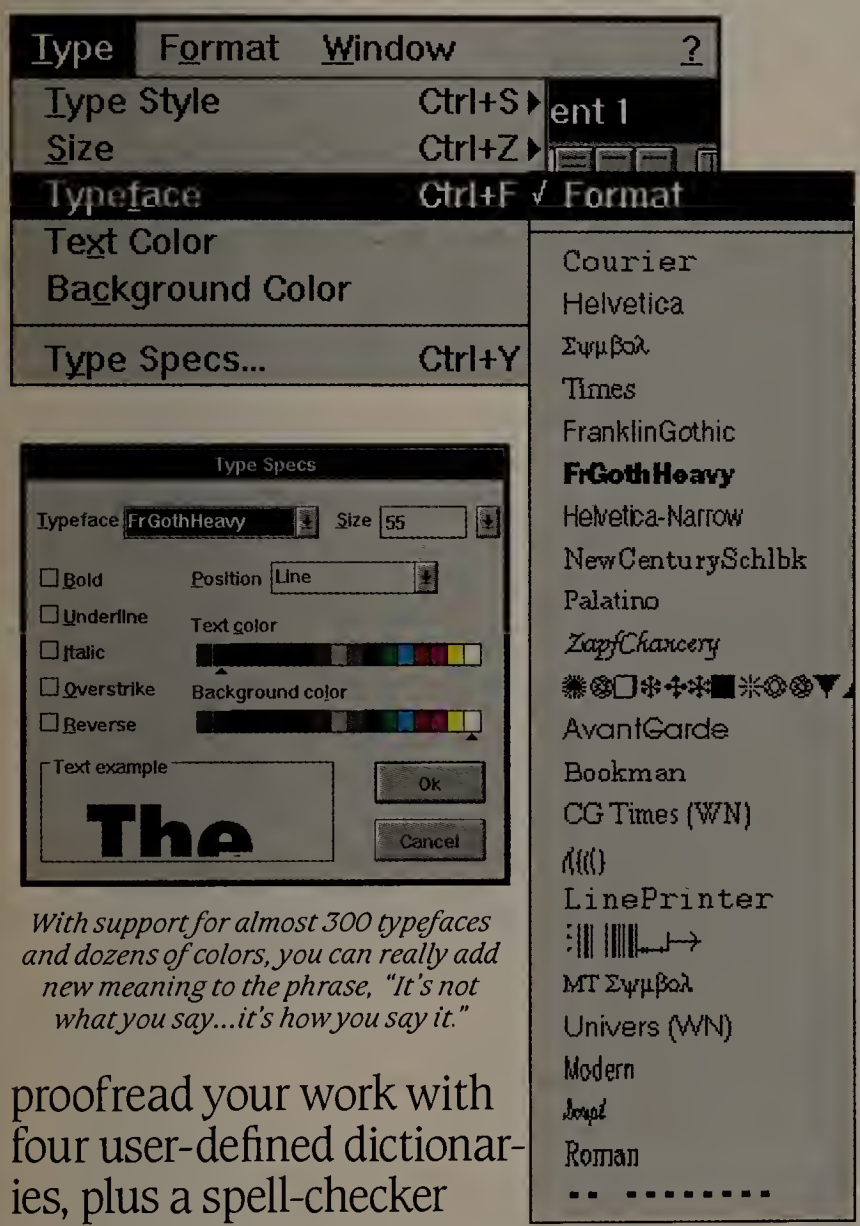
With new CA-Textor, you don't need to.

It can even

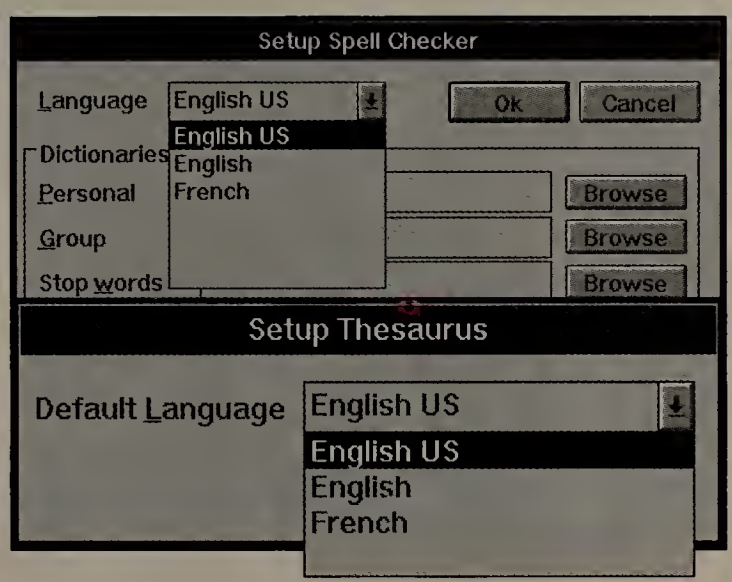
MICROSOFT® WINDOWS™

dIs Out.

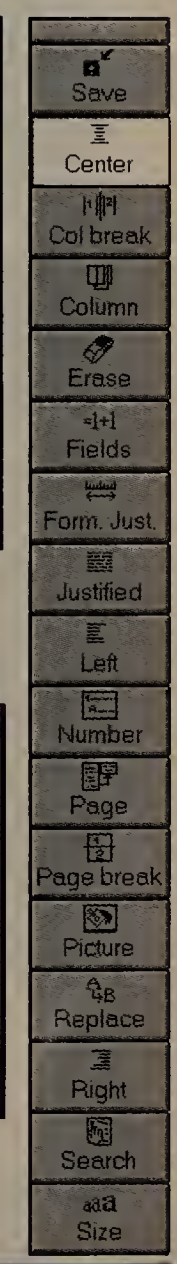
Easiest Word Processor You Will Ever Meet.

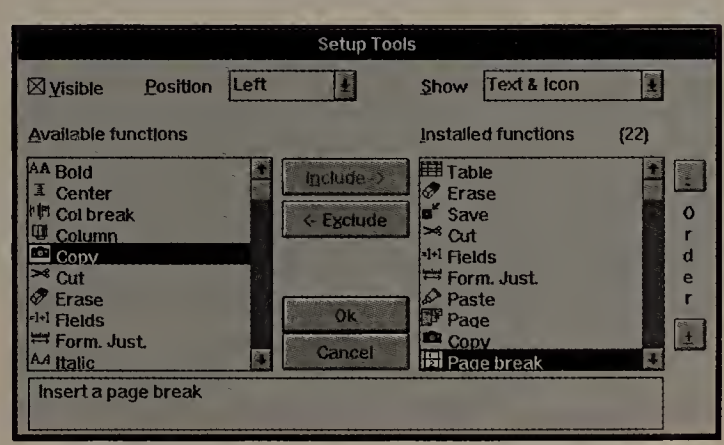


With support for almost 300 typefaces and dozens of colors, you can really add new meaning to the phrase, "It's not what you say...it's how you say it."



You'll never be at a loss for words with CA-Textor's powerful and easy-to-use thesaurus and spell checker. It's so smart, it even understands French.





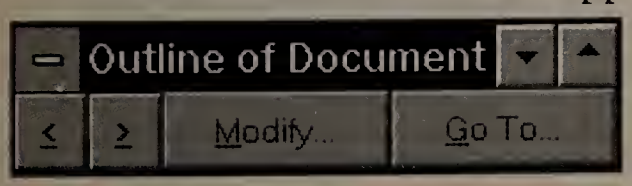
Customize the feature-rich tool bar in just seconds. Decide which tools you want, how they'll look and where they'll appear on screen.

proofread your work with four user-defined dictionaries, plus a spell-checker that understands American English, British English and French.

That's right–French!

CA-Textor is so user-friendly, it even lets you customize its feature-rich tool bar to match your own personal specifications.

Decide where the tool bar appears on your screen. Select icon and text formats for tool buttons.



Creating outlines has never been easier. Modify numbering levels and change headings instantly.

You can even arrange the sequence of push buttons you use most frequently.

To order your free CA-Textor For Windows Demo Disk, just dial 1-800 CALL CAI.

Do it right now.

And don't forget to tell 'em that you heard it here first.

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The Original AnthroCart...different widths, heights and depths. Over 40 accessories to add. Shelves adjustable in 1" increments.

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GSA contract no. GS-00F-5040A. Available for OEM applications. Prices from $159.
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What About OS/2?

In the past few years, I've had the chance to use OS/2 quite extensively and have grown to appreciate its capabilities. I am perplexed at the "ignore it, it's dead" attitude that computer publications take toward OS/2. This is sad because OS/2 has a lot of power that *Windows 3.0* and *3.1* lack.

CHRIS A. EPLAR
CHINA HILLS, CALIFORNIA

See our June issue for a first look at OS/2 2.0, and in this issue we compare OS/2 with DOS. We also plan to test OS/2's performance and look at new applications that take advantage of its 32-bit architecture. —Ed.

A Glaring Oversight

The Help Screen in April answered a question concerning programs that enlarge characters on a monitor. It failed to mention TeleSensory as a resource for screen enlargement systems. TeleSensory's *Vista* magnification system for IBM PC and PS/2 computers and compatibles enlarges text and graphics up to 16 times. Additionally, TeleSensory has speech systems, braille printers, and braille display output for computer screens.

KATHY GULEFF
STAFF WRITER
TELESENSORY

Missed Communication

I was pleased you noted that MCI users can exchange messages with Internet users in your response to Ian Spence of Toronto in April's *Communications Q&A*. However, the "preferred user" plan you refer to in that reply is our Preferred Pricing Option. For $10 per month, customers can send up to 40 electronic-mail messages or United States–bound fax messages. We don't offer unlimited electronic mail for $10 a month, as you say. We find, however, that the 40-message package satisfies the requirements of many of our customers.

CRAIG ZISKIN
MARKETING COMMUNICATIONS MANAGER
MCI INTERNATIONAL

I COULD HAVE GOTTEN IT FREE?

WHY PAY WHEN YOU CAN GET TODAY'S BEST PC NETWORK FREE FROM SITKA?

Yes! For a limited time you can get 2 nodes of Sitka's best-selling 10NET network, a $198 value, free. All that's required is proof of ownership of two network interface cards. The reason is simple. We know once you try 10NET, you'll be a customer for life.

With 10NET you get everything you've ever wanted in a network. Like the power to share files, programs and printers—and add as many users and nodes as you need. It's incredibly easy to use.

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And it offers full support for DOS and Windows all in one box.

So what have you got to lose? Call 1-800-795-0016 toll-free now for the name of your nearest Sitka 10NET dealer. Because getting anything else would be a waste of money.

MICROSOFT WINDOWS COMPATIBLE

YOU MIGHT WIN $500, CALL SITKA FOR DETAILS.

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Circle 265 on reader service card

Backup. For people who don't.

Circle 71 on reader service card

Everyone who uses a PC ought to back up regularly. But most people don't back up at all.

In fact, if the people you work with are like those working in most places we know, about the only way their data is going to get backed up is if it happens without them.

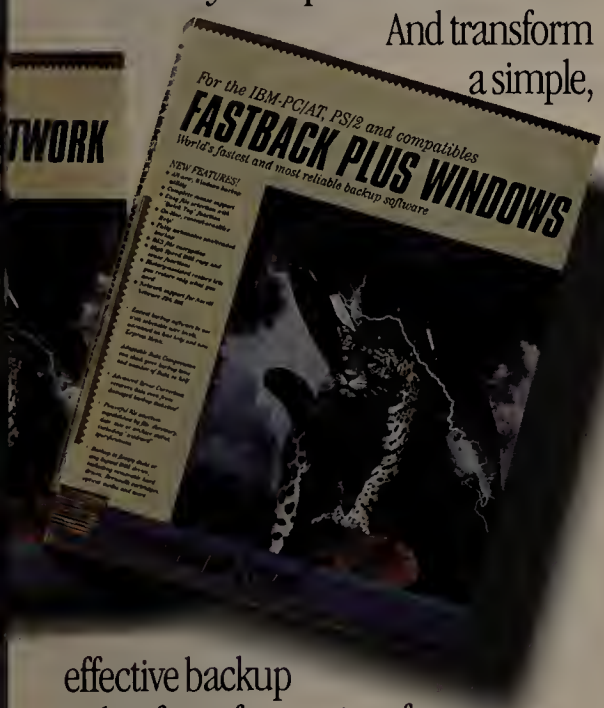
Guess what?

Now it can.

Now you can set up fully automatic, unattended backups for every PC in the house – DOS,® Windows,® Novell® network servers, even Macintosh.®

What's more, you can easily customize the nature and timing of each one to suit *your* specifications.

And transform a simple, effective backup policy from fantasy into fact.



All you need is Fastback Plus.

The world's most popular backup software comes complete with a backup policy of its own – in the form of pre-designed scheduling templates*– that you can adapt with our unique Macro Editor.

If automated, unattended backups aren't your style, you can still enjoy unprecedented convenience with our Express Menu, which InfoWorld *considers "only slightly more complicated than an on/off switch."*

What makes our Macro Editor unique?

It uses plain English commands. Which means you can actually use it.

Using Fastback Plus on a PC is very much like using it on a Mac – same look, same functionality.

Same backups, even.

That's right. You can actually restore a Mac file directly onto a PC, and vice versa.

Nobody else can do that.

But then, nobody else can back up more than 3MB per minute on an AT. Or up to 10MB per minute on a '386.

No other Windows, Mac or Network backup program can run fast enough to see our tail lights.

And nobody else comes close to our level of reliability.

You can destroy as much as 11% of the data on a diskette and Fastback Plus will recover every last byte, error-free.

Unbelievable?

That's what the people at *InfoWorld* thought.

So they "scratched both disks with the point of a knife to simulate accidental damage" and found, to their astonishment, that Fastback Plus "was 100% successful at restoring all the [damaged] files."

Still unsatisfied, they "ran the test several more times, increasing the severity of damage until we began to fear for our disk drives, but we were unable to generate a single byte of unrecoverable data."

We wouldn't recommend trying this test yourself. But if you insist, you'll be glad to know that Fastback Plus is backed up by our vaunted 24-hour toll-free technical support and a one-year money-back guarantee.

There's more. So pick up the phone. Dial 1-800-388-0362.

And tell everyone to stand back.

*Scheduling templates included in DOS, Windows and Network versions.

FIFTH GENERATION SYSTEMS, INC

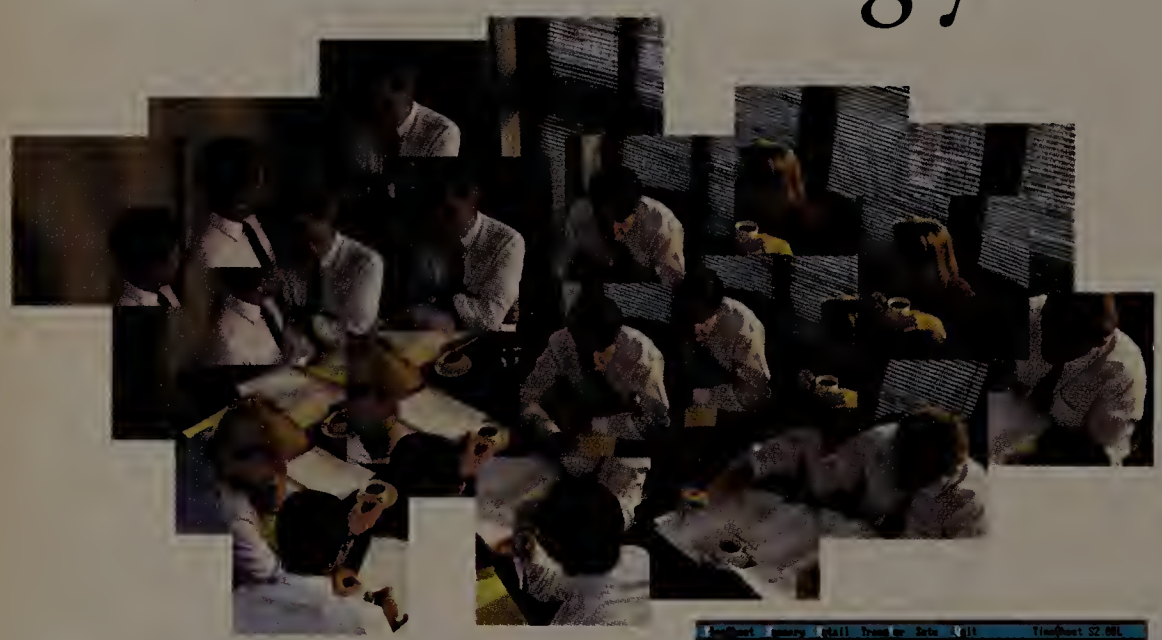
From Quicken to Managing Your Money

In the April issue, Steve Bass's *The Home Office* states that it's possible to import *Quicken* data into *Managing Your Money.* This is what I wanted, so I purchased *MYM* only to discover that there is no such capability.

KENT BAYER
VIA COMPUSERVE

Mr. Bayer is correct. Unfortunately, it is not possible to import data directly from Quicken *to* Managing Your Money, *though it is possible to import* Quicken *data using* Mymic, *a transfer utility now available from Meca Software (800/288-6322). I apologize for the error and any inconvenience that it may have caused. —Steve Bass*

Who's doing what, and what's it costing you?

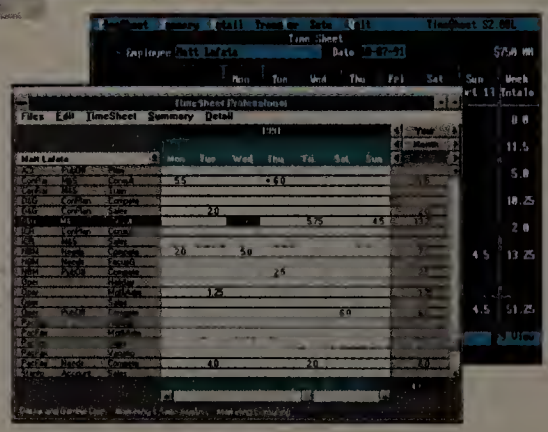


At last—an easy, effective software tool for tracking and analyzing the time spent on projects, clients, and activities: New TimeSheet Professional 2.0.

It lets users and workgroups enter tasks, notes and expenses into convenient week-at-a-glance timesheets. Then consolidate time and expense information into custom reports. See who's doing what, and what every minute is costing you. Then print your reports in high-quality output.

An optional D/X™ Data Exchange Utility* integrates time data with project management software like Time Line,® SuperProject,® Microsoft® Project for Windows,™ Project Workbench® and others.

Single user version is only $199.95, the 8-user Network Edition just $699.95. See your dealer today, or call TIMESLIPS Corporation for a FREE working model.



Both Windows and DOS versions feature week-at-a-glance timesheets for convenient time recording.

TimeSheet PROFESSIONAL

Make every minute count.

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(508-768-6100 in MA) or Fax 508-768-7660
In Canada call 800-359-3343.

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SYSTEM REQUIREMENTS: IBM® PC, XT,™ AT,® PS/2,® or compatible. Hard disk required. 420K RAM. DOS 2.1 or higher (Network Edition requires DOS 3.1 or higher) or Windows 3.0. TimeSheet Professional is a registered trademark of TIMESLIPS Corporation. ™ and ® represent trademarks or registered trademarks of their respective owners. *Sold separately

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Corrections and Clarifications

In the "Best of the Rest" table in April's "A Laser on Every Desk," the model of the C.Itoh ProWriter is CI-8E.

February's *Product Outlook* should have said that to upgrade the memory in Epson's ActionLaser II printer, you must populate an unpopulated Epson memory board with DRAM chips.

The March "Buyers' Guide: Super-VGA Monitors" should have said that compliance with the MPR II standard for electromagnetic emissions for Mag Innovision's 14- and 15-inch monitors is an option, not a standard feature.

In May, the photograph in "At Last, a Real Notebook From IBM" was by Alan Haywood. Michael Witte illustrated "Windows Data Query Shootout."

The *Norton Desktop for Windows* beta software we previewed in May's "Windows 3.1 Delivers" had tape support. The shipping product does not. It will be provided soon in a free upgrade.

PC World regrets the errors.

Mail your reactions, responses, and ideas to Letters, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Letters; CompuServe, 74055, 412; MCI Mail, PC World Editorial; or 415/442-1891 (fax). Include your name, city, state, and phone number. We reserve the right to edit letters.*

POWER TIP NO. 253

Blanking Lines in dBASE

Do you sometimes scroll back through *dBASE*'s dot command buffer to bring up an old command and then realize that you need to type a new one in its place? Just press **<Ctrl>-Y** to delete everything from the cursor to the end of the line.

Iftikhar Ahmed Khan
Karachi, Pakistan

INTRODUCING AFFORDABLE COMPUTERS FROM THE COMPANY THAT'S ALWAYS STOOD FOR MORE THAN AFFORDABILITY.

THE COMPAQ DESKPRO/i. SO A LIMITED PRICE LEADS

The company most qualified to advance the state of the desktop computer announces four systems that represent a breakthrough in R&D. At prices that won't ruin your P&L. Reflecting the level of thinking and quality that you've come to expect from Compaq.

At Compaq, there's a fundamental belief held by all of us that when you set extraordinary goals, extraordinary people will meet them.

Recently, for example, you made it clear to us that you wanted new PCs, with everything from advanced graphics to audio capability to affordable prices. Our response: the COMPAQ DESKPRO/i Family of PCs. Four new systems loaded with features to enhance productivity.

The built-in COMPAQ QVision 1024 Graphics Controller, for example, allows you to scroll, resize windows and pull down menus up to ten times faster than most popular video graphic subsystems. So quickly, as a matter of fact, you may find your computer waiting for you. Instead of the other way around.

Its unique processor upgrade path ensures that your PC won't be swept into obsolescence.

Simple chip upgradability and a 64-KB cache

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MUCH FOR THE IDEA THAT TO LIMITED THINKING.

memory module option provide quantum leaps in performance. Without similar outlays of cash.

Intel 386/25, 386/33, 486SX/25, 486/33 « *QVision accelerated graphics* « *Chip upgradability* « *Integrated business audio* « *4 MB RAM (expandable to 32 MB)* « *Cache memory standard* « *3 ISA expansion slots* « *3 drive bays* « *84-MB to 510-MB hard drive options* « *Multi-level security features* « *Microsoft MS-DOS 5.0 as published by Compaq*

The fully integrated audio system brings an unprecedented, yet not unfamiliar dimension to mainstream business computing: your voice. The result of a collaboration between Compaq and Microsoft, it allows you, among other things, to actually paste voice messages into spreadsheets and documents. Either as notes to yourself or as voice-mail across your entire network.

And we've engineered this breadth of technology right onto the PC's system board, preserving the small footprint, large storage capacity and expansion of the COMPAQ DESKPRO/i.

Not to mention your financial integrity.

Add CompaqCare, a new service and support program with our free one-year, on-site* limited warranty. An Asset Management Provision (that gives you and your network administrator a snapshot of your PC's configuration). And you have nothing short of a system that breaks a lot of new ground. Without breaking the bank.

For more detailed information, just call us at 1-800-345-1518, ext. 210 in the U.S., or call us at 1-800-263-5868, ext. 210 in Canada.

We bet you'll be as excited about the COMPAQ DESKPRO/i as we are.

In scrolling, window resizing and accessing menus, our new QVision accelerated graphics beat the competition by as much as 10 to 1.

You can paste voice messages into Microsoft Windows 3.1 business documents and spreadsheets with our integrated business audio system.

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OUR NEW NOTEBO
MILLION BUCKS. WHICH C
MISLEADING

Recently, our engineers set out to create a remarkably different notebook computer. With all of the quality, durability and features that you need. All at a sensible price. The result, as you can plainly see, is a remarkably different notebook. The new COMPAQ Contura PC.

One of the best things to happen to notebook computing since the fold-down airline tray table, the COMPAQ Contura Family of notebook PCs sets the standard for what an affordable notebook ought to be.

Just beneath its sleek, ergonomic styling lies the rugged, well-tested, well-thought-out PC you expect from Compaq.

No substandard parts

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OK PC LOOKS LIKE A OULD MAKE THIS THE MOST AD IN HISTORY.

or components. No second-rate manufacturing. No logos stuck on the outside after somebody else's guts went inside.

Thanks to high levels of chip integration and some of the smartest mechanical design this side of NASA, we've managed to engineer costs out and the right stuff in.

Intel 386SL/25 *with 64-KB cache « 4 MB RAM (up to 12 MB) « 60- or 120-MB hard drive*
Intel 386SL/20 *« 2 MB RAM (up to 10 MB) « 40- or 84-MB hard drive « Both models: 6.2 lbs. « 9.5" VGA display « Isolated inverted "T" cursor controls « 3.5-hr. NiCd battery (optional NiMH battery) « Microsoft MS-DOS 5.0 as published by Compaq*

Open either COMPAQ Contura PC and you'll find a large, 9.5-inch screen beaming brightly.

Lay your fingers on the keyboard and they immediately feel at home.

This notebook also has a unique ability to hibernate when left idle, saving all open files to the hard drive and automatically shutting your notebook down. Preserving your remaining battery life. Start up hours, days, or even years later, and you're right where you left off.

In addition to all of the above, the COMPAQ Contura notebook PCs support three internal power-conserving modems from Compaq.

All of which is backed by CompaqCare, our new service and support program, which includes a free one-year limited warranty good anywhere in the world. And free on-site* service anywhere in the U.S. and Canada.

For information, call 1-800-345-1518, ext. 220 in the U.S., or call 1-800-263-5868, ext. 220 in Canada.

We'll tell you more about it. We'll tell you all the places you can get it. And we'll tell you that you won't find an affordable notebook PC that looks this good and works this well no matter who you call.

Just because you're out of the office doesn't mean you're out of touch. The COMPAQ Contura PC features an optional power-conserving 2400-bps data/9600-bps fax modem.

As well as a uniquely sophisticated power conservation tool, Hibernation also serves as an easy-to-use placemark.

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AN INEXPENSIVE PC THA
FROM THE COMPANY T

What happens when the best computer engineers in the world design a low-priced desktop PC? You get the new COMPAQ ProLinea Line of PCs, perhaps the best value PCs in the world. What happens when a clone maker designs a low-priced PC? You get what you pay for.

When Compaq engineers set out to build an affordable, full performance desktop PC with all the essential features, there were a lot of options to choose from.

We could have bought an existing low-end computer company.

We could have farmed out all manufacturing.

We could have bought parts from the cheapest vendor in town.

But then all we would have ended up with is simply another inferior,

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T'S AS GOOD AS A COMPAQ. HAT OUGHT TO KNOW.

low-priced clone. And what we wanted was a low-priced COMPAQ computer.

Which is what you told us you wanted.

So through some high levels of chip integration and some equally high levels of engineering, design and just plain common sense, we've cut costs in system design and manufacturing.

Intel 386SX/25 « *small footprint* « *2 MB RAM* « *2 ISA slots* « *2 drive bays* « *40- or 84-MB hard drive*
Intel 386SX/25 « *2 MB RAM* « *3 ISA slots* « *3 drive bays* « *84- or 120-MB hard drive*
Intel 486/33 « *4 MB RAM* « *3 ISA slots* « *3 drive bays* « *84- or 120-MB hard drive*
All models include high-resolution 1024 x 768 video and pre-installed Microsoft MS-DOS 5.0 as published by Compaq

While still managing to deliver 100 percent of the virtues you've come to expect from Compaq.

You can choose from three different models, opting for either Intel 386SX/25 or 486/33 processing power.

So whether it's expansion, storage, processing speed or a small footprint that you're most concerned with, there's a model perfectly suited to your needs.

And each comes with a high-resolution 1024 x 768 video system.

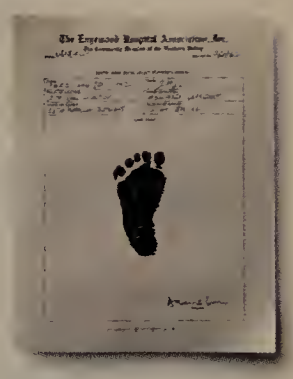
Most importantly, the new COMPAQ ProLinea PCs are backed not only by the assurance of the COMPAQ name, but also by CompaqCare, our new service and support program. Which includes a free one-year, on-site* limited warranty, and a host of other services.

And to go along with our new line of PCs, there's a whole new line of places you can find them. Give us a call for more details.

In the U.S., call us at 1-800-345-1518, ext. 215, and in Canada, just call 1-800-263-5868, ext. 215.

We think you'll be pleasantly surprised at exactly how much the COMPAQ ProLinea PCs have to offer.

And equally surprised by how little we're able to offer them for.



All in all, the COMPAQ ProLinea 3/25zs PC sizes up quite nicely. At a mere 12.6" x 14.9" x 3.5," it's one of the smallest footprints in the industry.

All of our models are backed by CompaqCare, our comprehensive new service and support program. For details, just call 1-800-345-1518.

COMPAQ

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AFFORDABILITY RUNS DEEP.

Affordable prices aren't limited to our new products. In fact, we've lowered suggested list prices by up to 40% on COMPAQ hardware. And even more on our list of options.

In the past twelve months at Compaq, we've incorporated major efficiencies in design, engineering and manufacturing across our product line.

As a result, you'll notice savings on everything from our notebook PCs to our desktop computers to our servers to our extensive list of optional equipment. The right computer at the right price.

The following list includes just some of the COMPAQ products that are now more affordable. Obviously, when it comes to the subject of affordability, we could go on and on. But we'd rather talk to you directly.

Give us a call and we'll tell you where you can find new COMPAQ products, not-so-new COMPAQ products and the new prices for both.

Call 1-800-345-1518, ext. 225 in the U.S., or in Canada, call 1-800-263-5868, ext. 225.

DESKPRO 386s/20N Model 0 « DESKPRO 386s/20N Model 1 « DESKPRO 386s/20N Model 60 « DESKPRO 386s/20 Model 1 « DESKPRO 386s/20 Model 60 « DESKPRO 386s/20 Model 120 « DESKPRO 386/25M Model 1 « DESKPRO 386/25M Model 60 « DESKPRO 386/25M Model 120 « DESKPRO 486s/16M Model 1 « DESKPRO 486s/16M Model 60 « DESKPRO 486s/16M Model 120 « DESKPRO 486s/25M Model 1 « DESKPRO 486s/25M Model 60 « DESKPRO 486s/25M Model 120 « DESKPRO 486/33M Model 1 « DESKPRO 486/33M Model 120 « DESKPRO 486/33M Model 340 « DESKPRO 50M Model 1 « DESKPRO 50M Model 120 « DESKPRO 50M Model 340

PORTABLE 486c Model 120 « PORTABLE 486c Model 210 SLT 386s/20 Model 60 « SLT 386s/20 Model 120 « LTE Lite/20 Model 40 « LTE Lite/20 Model 60 « LTE Lite/20 Model 84 « LTE Lite/25 Model 60 « LTE Lite/25 Model 84 « LTE Lite/25 Model 120 « LTE 386s/20 Model 30 « LTE 386s/20 Model 60 « LTE 386s/20 Model 84

SYSTEMPRO/LT Model 486-SX/25-210 « SYSTEMPRO/LT Model 486SX/25 510« SYSTEMPRO/LT Model 486SX/25-680 « SYSTEMPRO/LT Model 486/33-210« SYSTEMPRO/LT Model 486/33-510 « SYSTEMPRO/LT Model 486/33-1020 « SYSTEMPRO 486/33-420 « SYSTEMPRO 486/33-840 « SYSTEMPRO 486/33-2040

40-Megabyte Hard Drive « 60-Megabyte Hard Drive « 84-Megabyte Hard Drive « 120-Megabyte Hard Drive « 210-Megabyte Hard Drive « 340-Megabyte Hard Drive « 510- Megabyte Hard Drive « 240-Megabyte Drive Array Pair « 420-Megabyte Drive Array Pair « 680-Megabyte Drive Array Pair « 1.02-GB Drive Array Pair « 1-Megabyte Memory Module « 2-Megabyte Memory Module « 4-Megabyte Memory Module « 8-Megabyte Memory Module « 2-Megabyte Single-Socket Memory Module « 8-Megabyte Single-Socket Memory Module « 32-Megabyte Dual-Socket Memory Module « 1.3-GB Differential Interface Hard Drive....

COMPAQ

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Circle 47 on reader service card

CONSUMER WATCH

BY ROBERTA FURGER

Advice and information for the computer consumer

A Trip to the Gray Market

Thousands of PC users buy laser printers each year—and more than half of those sales go to Hewlett-Packard, whose LaserJet line is the hands-down market leader.

Although some buyers—particularly those from large corporations or institutions—routinely order from a local reseller with whom they've established a long-term relationship, many simply shop around for the best deal, whether it's offered by a local store or a far-away mail-order firm.

An HP is an HP no matter where you buy it, right? So why not simply buy from the firm that can give you the lowest price?

That was the attitude of two PC users who recently wrote to *Consumer Watch* about their experiences in purchasing a laser printer. Both buyers found themselves caught in the computer *gray market*, the term for goods sold by unauthorized distributors. They learned the hard way that *where* you buy equipment can be as important as what you buy.

Markus Hill, vice president of Mega Computer Services of Martinsville, Virginia, ordered an HP DeskJet 500C last February from Paradise Computer Products of Kihei, Hawaii. He knew he was in trouble the minute he began unpacking his order: Instead of the standard HP power supply, the shipment included a *used* Commodore power supply. Hill contacted Paradise, but no one could explain the mix-up. They told him to return everything and that they would correct the error.

A short while later, Hill received the same unit, this time with the correct power supply. He set up the unit, eager to try his new purchase. He was disappointed to find that the printer didn't work. "The paper would not feed into the printer, and the print cartridge assembly was defective," says Hill.

Rather than go another round with Paradise, Hill packed up the printer and returned it for a full refund—but once again ran into problems. Company representatives told him $20 would be deducted from his refund because he no longer had the original packaging, which had been destroyed in transit. At that, Hill decided to contact HP directly to see if they could help.

"We were given the option of returning the defective printer for repairs, or simply having HP send a completely new unit as a replacement," says Hill. He opted for the replacement, and received a new unit in two working days.

In his conversations with HP, Hill learned that Paradise was not an authorized reseller. "If they had been, Hewlett-Packard would have required them to immediately ship us a replacement power supply," says Hill.

Hill is correct—in theory, at least. Authorized dealers don't want to lose the lucrative right to sell LaserJet printers, so any intervention from Hewlett-Packard is likely to result in prompt resolution of your problem—leverage HP can't bring to bear on an unauthorized dealer.

The second letter writer, Michael Brock, bought an HP LaserJet IIIP printer and thought all was well until he tried to get an extended warranty for

BUG WATCH

Up-to-date information about hardware and software bugs

Microsoft Word for Windows 2.0 MoreFonts 3.0

There is an incompatibility problem with some releases of *Microsoft Word for Windows 2.0* and *MoreFonts 3.0*, a stand-alone font package by MicroLogic. The icons at the top of the *Word for Windows* screen appear in black when *MoreFonts* is installed. MicroLogic has an update disk.
MicroLogic
510/652-5464

Microsoft Windows 3.1 and Logitech Mice

If you installed *Windows 3.1* only to find your Logitech mouse no longer works, fear not. When upgrading from *Windows 3.0*, the *Windows 3.1* installation program tells you you already have a mouse driver and asks if you want to keep it. Users who answer yes will find their mouse does not work. To repair the problem, go to the *Windows* directory (without launching *Windows 3.1*), type **SETUP**, and press **<Enter>**. Select *Mouse* and *Logitech*. The setup program will prompt you for the *Windows* disk it needs.
Microsoft
206/454-2030
Logitech
510/795-8100

—*Christina Wood*

Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with broadest interest.

Christina Wood is an assistant editor at PC World.

ANTHONY RUSSO

the unit. HP Canada told him his original warranty was invalid, because he bought the printer from an unauthorized dealer.

After a considerable amount of negotiation with HP, Brock's printer was covered, but the entire process left him questioning HP's policy. "Does Hewlett-Packard want to be known as a company that penalizes customers for the questionable practices of its dealer network?" asks Brock. "It seems that this policy is designed to restrict competition and maintain excessive profit margins because the unauthorized dealers are selling HP printers at prices far below those available from authorized dealers."

Hill's and Brock's experiences are not unique, nor is the gray market limited to printers. The gray market—which, despite its somewhat sinister name is not illegal—thrives in all segments of the PC industry.

It works like this: Hardware manufacturers, such as Hewlett-Packard, establish a relationship with a select group of resellers, often the larger, nationwide chains. In return for volume discounts, the reseller agrees to meet a sales quota and to follow specific guidelines for customer service and repair, including honoring the standard HP warranty and either providing repairs themselves or referring customers to an authorized repair center.

But when times are tough and dealers can't make their quotas, some sell their excess units to other—unauthorized—resellers rather than risk losing their privileged status. The result is the gray market.

Hewlett-Packard considers the gray market a serious problem—it erodes pricing and reduces control over the quality of sales, support, and service provided by resellers. Gray market sales can also result in higher service costs for the company, because customers who purchase printers from unauthorized dealers often turn to the manufacturer when they need service.

To discourage gray market sales, HP Canada has a policy of not honoring warranties on printers purchased from unauthorized dealers. As in Brock's case, however, the company doesn't always follow this policy because it ultimately means punishing the end user. In the United States, Hewlett-Packard honors all warranties, regardless of where a printer is purchased. Although the company strongly encourages users to buy from authorized dealers, "we won't penalize users for the dysfunctional behavior in the channel," says Jim Lucas, sales development manager for the LaserJet line.

So, if HP honors all its warranties, should you care where you buy the printer? It depends.

Before buying, ask yourself—and the reseller—these questions: Will the dealer fix the printer if it breaks down? If not, will you be able to get it serviced locally from an authorized service center? (Although authorized dealers are supposed to handle all repairs—even on units they didn't sell—dealers usually put their own customers first, so you may be in for a wait.)

To find out if the dealer you are considering is authorized by HP to both sell and service your printer, call 800/752-0900 in the United States or 800/387-3867 in Canada (check your phone directory, as this number may differ for different provinces).

There's no guarantee that even an authorized dealer is going to handle service and support issues quickly and responsibly. But if the dealer isn't authorized, you've got no leverage whatsoever.

SHOP TALK

Don't Confuse Us, Please

We read with interest your January *Consumer Watch* article "Mail-Order Nightmares." However, we hope your readers do not confuse troubled Stargate Computer of West Hatfield, Connecticut, with our company, Star Gate Technologies of Solon, Ohio.

We are a well-established and reliable manufacturer of multiport serial communication products, which sell through our national and international distribution network.

Although we are not a mail-order business, we hope your readers will become familiar with our products without thinking that the Stargate of your article is Star Gate Technologies.

ROBERT SEARSON
DIRECTOR OF MARKETING
STAR GATE TECHNOLOGIES
SOLON, OHIO

Where's That Rebate?

I'm having a problem with the responsiveness of Delrina Technology. In July, I purchased a copy of Delrina *PerForm Designer & Filler 2.1*. About a week later I sent Delrina the warranty and registration card and the certificate for a $30 rebate. This rebate was a factor in my selection of the product.

I didn't receive the rebate, so I sent another letter including copies of the registration cards and rebate certificates, but they have ignored me.

ANDREW DETRICK
BELLEFONTAINE, OHIO

Editor's note: When contacted by PC World, *Delrina immediately mailed Detrick his $30 rebate. According to a company spokesperson, the offer was very successful and 99 percent of the rebates were issued in a "timely and courteous fashion."*

A Design Flaw or a Virtue? You Be the Judge

I recently purchased a computer, and shortly after setting up the system, I noticed a fine, black horizontal line across the monitor screen, just below the center. It was particularly annoying when I was using *Word for Windows*, because the line looks like a page break. I received a replacement monitor from the company that sold me the computer system and was disappointed to discover the same black line.

I called technical support again. The technician explained that the internals of the Sony tube caused this phenomenon and suggested I adjust the bright-

LASERNET®

The Sharing Family With Peripheral Vision

Only Western Telematic's LASERNET sharing devices have true peripheral vision — the widest family of products to meet the needs of today's data sharing requirements. Whether it's a simple sharing set-up or a complex network — LASERNET has a device to fit your need and budget.

Western Telematic has peripheral vision in support software too! LASERNET provides easy-to-use device-select software operable with both Windows™ or MS-DOS® applications.

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HIGH-LEVEL

Multi-Link™

Serial/parallel device for twelve or more users. Expandable, through dedicated high-speed link, up to 384 any-to-any, user-selctable ports, over 4000 feet. Perform printer/plotter sharing, modem/FAX sharing, PC-to-PC file transfer and more.

- 12 concurrent high-speed ports — 8 serial, 4 parallel
- High-speed link — up to 32 Multi-Link devices — 384 total ports!
- Dynamically allocated, field-expandable SIMM memory — 256 KB to 4 MB
- RJ-11 serial ports for snap-in cabling
- Any-port-to-any-port connectivity
- Any-port designation for printer or plotter
- Each port individually programmable
- Windows or DOS pop-up menu software for instant device selection and status
- Uses standard parallel PC-to-printer cables

12 any-to-any ports; buffered from 256 KB to 4 MB .....start at $795

GENERAL

PSU-82C/SP

Programmable sharing units for both serial/parallel printers, plotters and PCs. Designed for CAD/CAE, high-level graphics, Desktop publishing or general applications.

- 4 concurrent serial and 4 parallel inputs (SP)
- 8 concurrent serial inputs (C)
- 1 serial and 1 parallel output
- Expandable buffer memory from 256 KB to 2 MB
- Separate baud rate, flow control, parity and messages for each port
- Pop-up menu software for easy printer/plotter selection
- Easy menu-driven configuration and set-up
- Prompt and response messages for plotter applications
- Support all laser printers including PostScript® printers and all types of plotters.

8 inputs; 2 outputs; buffered from 256 KB to 2 MB.....start at $595

QwikShare® III

Low-cost, expandable, all-parallel, high-speed printer sharing system. From one to 32 PCs independently share up to three remote and one local parallel laser/dot-matrix printer or plotter.

- Expandable to 32 PCs by adding Expansion Modules
- Memory expandable up to 4 MB
- Printer Select Switch — no software or TSR program required
- All parallel port connections — PCs, printers and plotters
- Maximum network distance — 4000 feet
- Quick and easy installation using snap-in, RJ-11 cable & standard parallel cables

Printer Server; buffered from 256 KB to 4 MB .....start at $295
Expansion Module with Printer Select Switch .....$149 ea.

QwikShare® II

Low-cost, buffered printer sharing. Supplied with Windows and MS-DOS device-select software which provides pop-up menus for easy printer port selection.

- 6 RS-232 serial inputs - RJ-11 connectors
- 2 user-selectable laser/dot-matrix printer ports
- Expandable memory to 2MB using SIMMS
- Input speeds up to 115K baud

6 inputs; 2 outputs; buffered from 256 KB to 2 MB.....start at $295

BASIC

QwikShare®

Complete, plug-n-go, "no-wait" sharing system. Up to six IBM PCs or compatibles can share a serial laser/dot-matrix printer or plotter. Each system contains: sharing unit; super-fast spooling software; three — 9- and 25-pin connectors; four —25 ft. PC cables; one —5 ft. printer cable & connector. Compatible with most popular graphics, word processing and spreadsheet software including Microsoft® Windows™.

6 inputs; 1 output; $195

LASERNET products are **made in U.S.A.**, and backed by a **3-year** limited warranty with service and technical support. To get a closer look at LASERNET, just call on our technical sales representatives.

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*Visa, MC Accepted; Same Day Shipping

Circle 325 on reader service card

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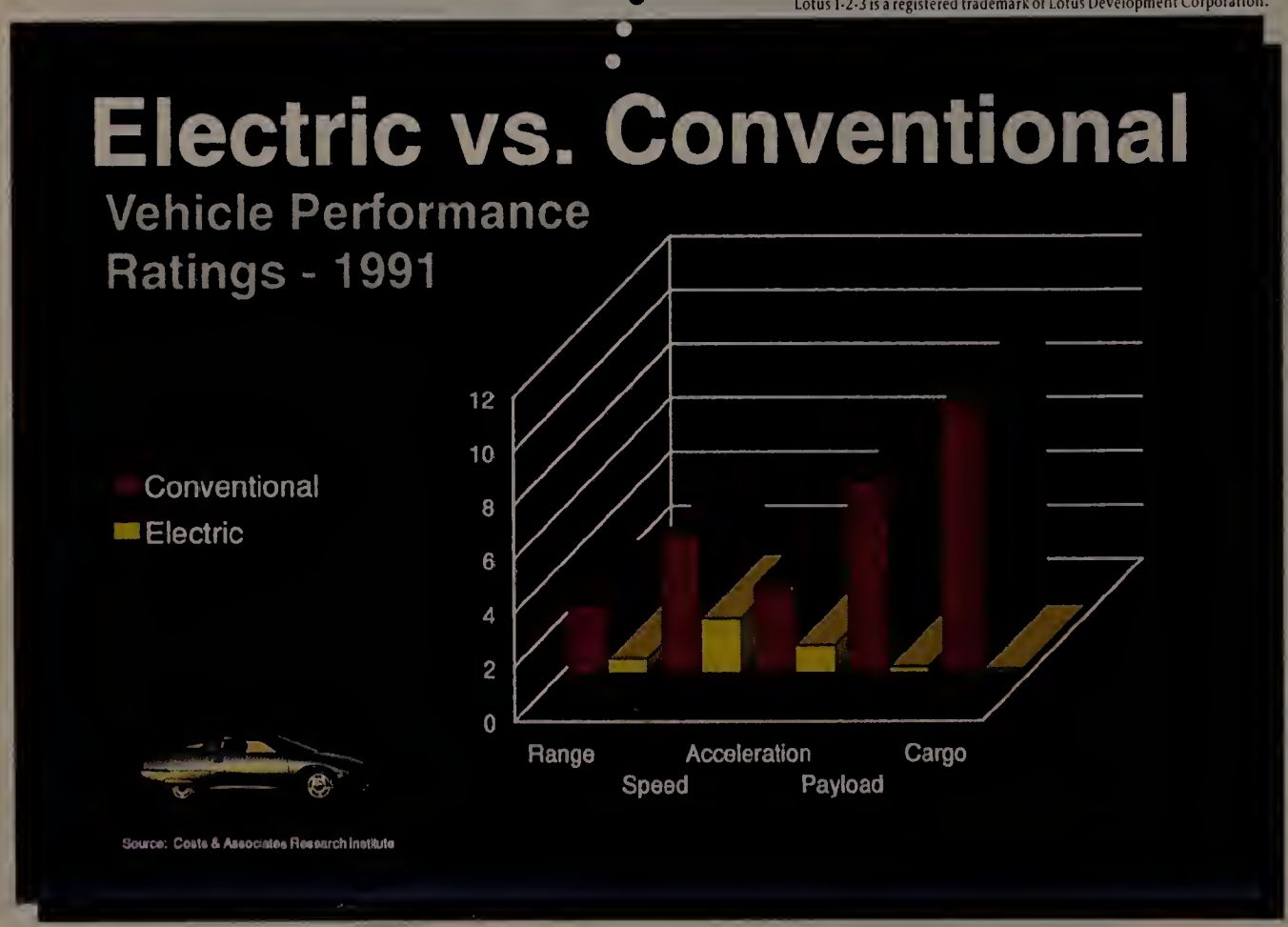
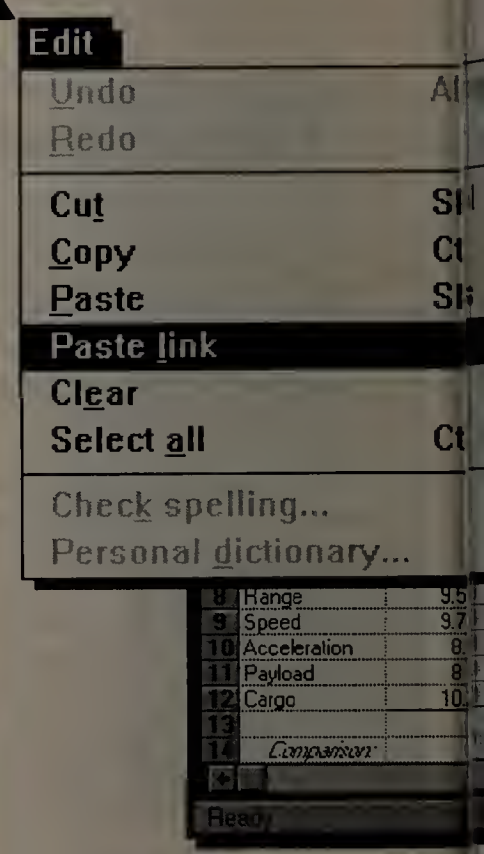
How to change out-of-





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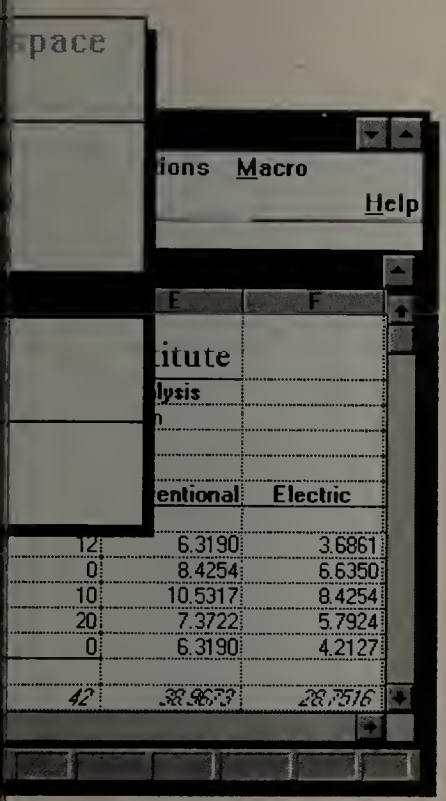

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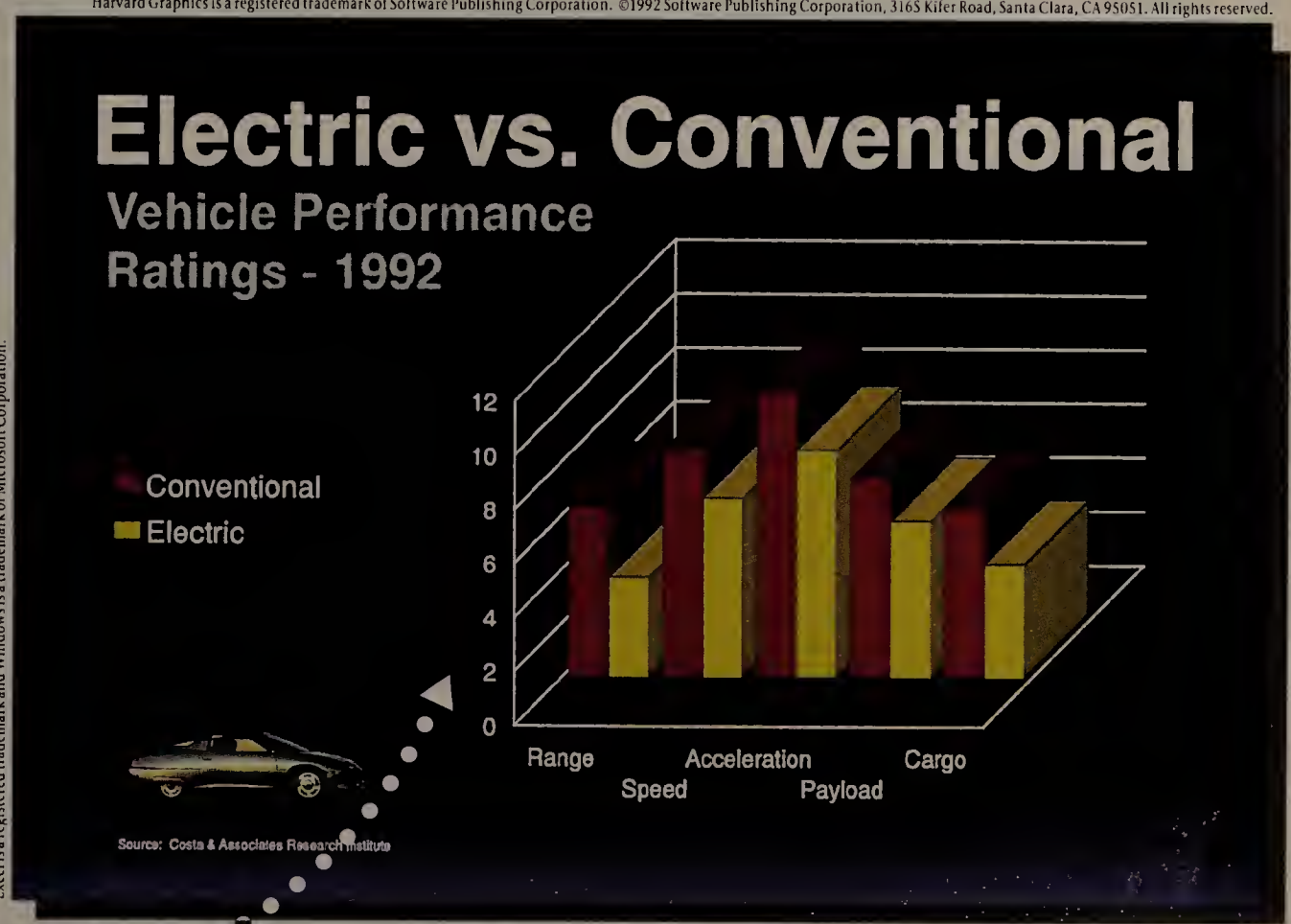

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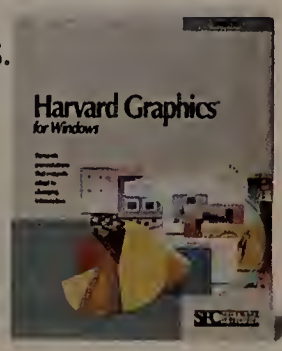
There are 54 presentation styles, including coordinated backgrounds, layouts and palettes. And our new global edit feature lets you instantly apply style changes to your whole presentation at once.

Last minute changes in output, say from slides to overheads, are a snap, too. You simply pick the output device, the program automatically re-formats your slides to match it.

And, of course, we support all the popular output devices—from laser printers to the Autographix Overnight Slide Service. So even when changes come late in the day, everything will be up-to-date in the morning.

Harvard Graphics for Windows.

Everything else is simply out-of-date.



Harvard Graphics for Windows demo disk.

SPC SOFTWARE PUBLISHING CORPORATION

ness and contrast to minimize the line. To my way of thinking, these controls should be used to achieve the best clarity of text and graphics, not to disguise an obvious design flaw.

DAVID WALSKE
BEVERLY HILLS, CALIFORNIA

Editor's note: Walske's was one of two letters Consumer Watch *received about the horizontal line on monitors with Sony tubes. The second writer, D. Rodney Stites, was equally annoyed and posted a note on CompuServe detailing his experience. "I had 20 replies in eight hours," wrote Mr. Stites. "The line," he adds, "is considered a major or minor annoyance, depending on one's tolerance for imperfection in an expensive product. Graphics-oriented people hate it. Other users were not aware of it until I posted my note, then they reported seeing it."*

Sony responds: One of the unique features of the Trinitron CRT is what is called the Aperture Grille, which consists of a series of long vertical slits fastened with strong vertical tension to a steel supporting frame. Electron beams pass through the Aperture Grille to illuminate phosphor on the faceplate. The vertical tension for the Aperture Grille absorbs any thermal expansion, resulting in superior picture quality.

Since the CRT requires a vacuum to function, a damper wire, which is approximately 15 microns in diameter, is strategically placed on the Aperture Grille in order to reduce susceptibility to resonance. The "line" that some customers see on the screen is not a fault, but rather the damper wire, which has always been an integral part of our Trinitron technology.

ERIC KORMAN
DISPLAY DEVICE OEM MANAGER

Letter Writing Made Easy

Have you ever sat down to write a letter to the Better Business Bureau or state attorney general's office, but stopped midsentence because you weren't sure to whom you should send your complaint or what information it should include?

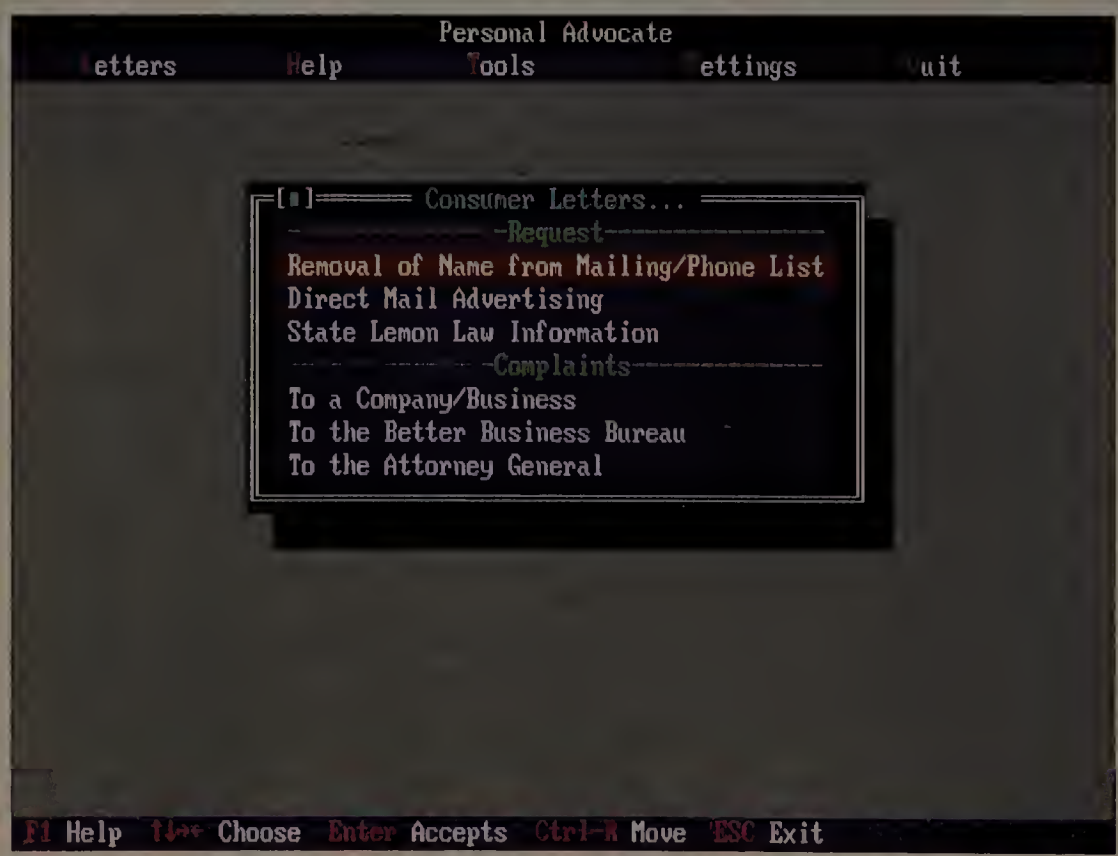
Well, you don't have any more excuses *not* to write that letter. Parsons Technology has introduced *Personal Advocate,* an easy-to-use and incredibly useful program with dozens of sample letters covering everything from disputing an item on your credit card statement to obtaining information on your state's Lemon Law. General topics covered in the letters include alimony and child support; consumer, credit, and government issues; Medicare and Social Security questions; and requests for personal records, such as birth, death, and marriage certificates.

Every sample letter includes an information field that explains what to expect from sending a letter, what facts to include, and a list of other agencies or groups that may be of service. Just enter your personal information once during setup, and relevant details are automatically entered into the selected letter.

Even better than the standard letters and helpful information, though, is the huge data base of addresses for everything from environmental and consumer groups to state and federal regulatory agencies, congressional representatives and senators, and even 600 large corporations. No more calling the operator or plowing through government bureaucracy to figure out who should get your letter.

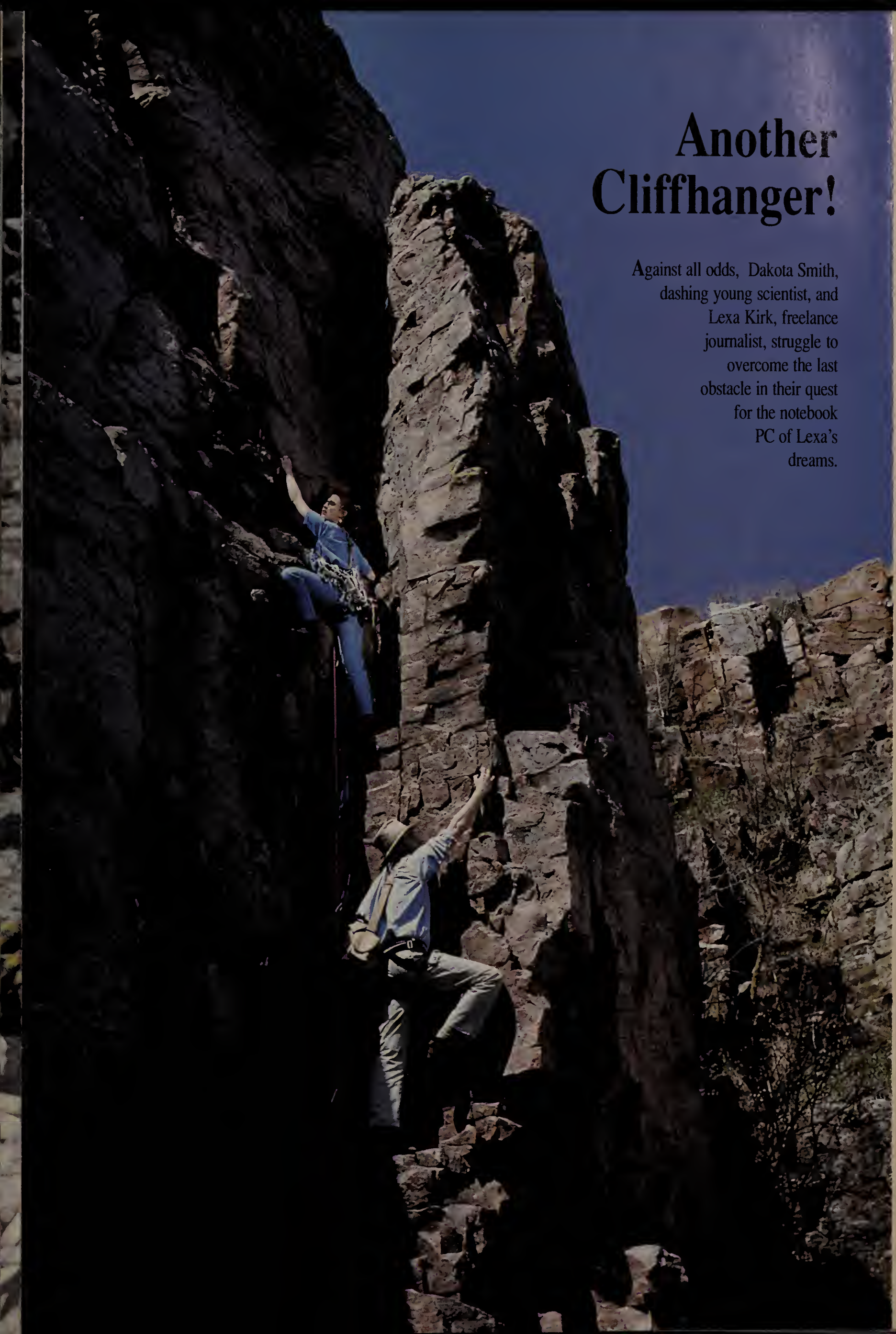
Priced at $69, *Personal Advocate* requires 512K of RAM, DOS 2.11 or later, and a hard disk. The data base of addresses will be updated semiannually. The first revision is due out in January 1993 and will reflect post-election changes in the U.S. Senate and House of Representatives. The cost will be $12, plus $3 shipping and handling. There's no reason to delay any longer. Write that letter—you'll feel better in the morning.

Parsons Technology, One Parsons Dr., P.O. Box 100, Hiawatha IA, 52233-0100; 800/223-6925, 319/393-1002 (fax).



Don't know where to turn? Try Personal Advocate. It supplies form letters for resolving most consumer issues and a data base of contacts so your letters will hit their mark.

Think you've gotten a raw deal—or a great one? Mail the details to Consumer Watch, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Consumer Watch; MCI Mail, PC World Editorial; CompuServe, 74055,412; or 415/442-1891 (fax). We'll investigate complaints and publish letters with the broadest interest.*



Another Cliffhanger!

Against all odds, Dakota Smith, dashing young scientist, and Lexa Kirk, freelance journalist, struggle to overcome the last obstacle in their quest for the notebook PC of Lexa's dreams.

Holy C

They've Discovered Another Noteboo

HANDBOOK

Following the map they discovered deep inside a mysterious cave, Dakota Smith and Lexa Kirk continue on their journey. While Dakota found his notebook treasure in the form of the Gateway 2000 Nomad series, Lexa is still searching for her dream: a cross between a notebook and a palmtop. Drawn as if by mystical forces, Dakota and Lexa travel into craggy terrain. The pull grows stronger, till they are confronted by a sheer cliff. She looks at him and proclaims, "I can feel in my heart that my quest is nearly fulfilled; surmounting this one last obstacle will surely be rewarded!"

The two scale the cliff and find a most astonishing little machine — about half the size

alf!

Treasure From Gateway 2000!

Dakota and Lexa -- Gateway 2000 employees Phil and Mary -- photographed in Palisades State Park near Sioux Falls, South Dakota.

of most notebook computers!

"The Gateway 2000 Handbook!" she sighs reverently. "What a discovery! This could be the first product in a new category of portable PCs!" Although it weighs only 2.75 pounds, the HandBook has 286-class performance, a bright, backlit screen, a real hard drive and a great keyboard.

And so, Dakota and Lexa set forth on a new mission to tell the world about their discoveries.

TO BE CONTINUED...

GATEWAY2000

You've got a friend in the business.

8 0 0 - 5 2 3 - 2 0 0 0

The Explorers' Notes

The HandBook we discovered is a totally new notebook product — a real PC in miniature form!

HANDBOOK

- Weight 2.75 Lbs. (HandBook & Battery)
- Dimensions 5.9" x 9" x 1.4"
- 4-Hr.* NiMH Battery, 14-Oz. Charger, 6.5" x 2.5" x 1.5"
- Traveling Weight 3.5 Lbs. (HandBook, Battery & Charger)
- C & T® Processor, 286 Class Performance
- 1MB RAM
- 40MB Hard Drive
- Backlit 7.6" Double-Scan CGA Screen, 640 x 400 Resolution
- 1 Parallel/1 Serial Port
- 78-Key Keyboard, 101-Key Emulation, Inverted T Cursor Pad
- DOS, File Transfer Software & Serial Download Cable
- Introductory Bonus Pack
- Carrying Case

$1295

Options: FieldMouse pointing device, 2,400 bps modem, alkaline battery pack, portable printer, combo unit (3.5" drive with extra serial port and parallel port), extra batteries

In discovering the HandBook, we found what could be the first product in a new category of portable PCs. It's smaller and lighter than a notebook, but it's bigger and much more functional than a palmtop.

The HandBook's performance is comparable to a 286 system. Real PC features include a bright, backlit screen, a bonafide hard drive and a comfortable keyboard (no chiclet keys). Yet it weighs only 2.75 pounds. You can travel with the HandBook and not even know you're carrying it. When you get home, downloading information from your HandBook to your office computer is easy with the serial cable and file transfer software provided.

PC Magazine says, "Desktop PCs are faster (than notebooks)..." That was before we found the Nomads!

The Nomad notebooks we discovered are highly unusual. Our theory is they were designed to let you take desktop computer performance anywhere you go in a small, lightweight notebook. And using the patented power management system, we got over six hours of operation from a single battery on the 425DXL. Power management includes a 5.7 amp/hour battery and patented power-saving BIOS and software features.

The Nomad screens are bright and crisp. Resolution is 640 x 480, 64 gray scale, on the LCD. With 1MB video RAM, you can also display on an external monitor simultaneously. There's another Nomad characteristic that sets these notebooks apart from most others. They're made in the U.S.A.!

NOMAD Options: 2,400/9,600 bps modems, portable printer, numeric keypad, Token Ring or Ethernet interfaces, SCSI interface, memory upgrades, executive carrying case, extra batteries

**Battery life was measured with power management enabled.*

NOMAD

- Weight 5.8 Lbs. (Nomad & Battery)
- Dimensions 8.5" x 11" x 1.8"
- 6-Hr.* NiCad 5.7Ah Battery
- 14.4-Oz. Battery Charger, 6.12" x 2.25" x 1.5"
- Traveling Weight 6.7 Lbs. (Nomad, Battery & Charger)
- Backlit 10" VGA Screen, 640 x 480 Resolution, 64 Gray Scale
- Simultaneous Video with 1MB
- 1.44MB 3.5" Diskette Drive
- 1 Parallel/1 Serial Port
- External Video & Expansion Bus Ports (Ports are Full Size)
- 79-Key Keyboard, 101-Key Emulation, Inverted T Cursor Pad
- FieldMouse™ Pointing Device
- MS DOS 5.0 & Windows™ 3.1

NOMAD 325SXL • $1995
25MHz, 386SXL, 2MB RAM, 80MB Hard Drive

NOMAD 420SXL • $2795
20MHz, Intel® 486SXLP, 4MB RAM, 80MB Hard Drive

NOMAD 425DXL • $3495
25MHz, Intel 486DXLP, 4MB RAM, 120MB Hard Drive

800-523-2000

610 Gateway Drive • P.O.Box 2000 • North Sioux City, SD 57049-2000 • 605-232-2000 • Fax 605-232-2023

All prices and configurations are subject to change without notice. Prices do not include shipping.

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WHAT ? NEXT

By MIKE HOGAN

Business Audio: Don't Call It Multimedia

Hear the Sound of Your Master's Voice—And Make Him Pay for It

MICHAEL LLEWELLYN

Okay, so why haven't you done your duty and bought a multimedia PC? Dozens of companies have invested millions to convince you that you can't live without *Roget's Electronic Thesaurus* or those cool whale and porpoise sounds in *Grolier's Multimedia Encyclopedia.*

Yeah, I know, poor excuses to stick another $700 to $1000 into a $1700 486SX or $1000 386SX. You'd get hooked on those disks if you had them, and sound board/CD ROM upgrade kits like Media Vision's aren't hard to install. Still, who wants to cozy up to ribbon cables and IRQ channels without a better payoff?

No, what you need is a good business excuse to get your company to buy you a fully outfitted multimedia PC. What if you could send voice-annotated spreadsheets, documents, and E-mail to your co-workers? And what if they were able to play these back for free or next to nothing?

Then you'd be only a CD ROM drive away from creating animated laptop business presentations backed up with CD-quality music. You'd save your company training dollars by fetching your own *1-2-3 for Windows* formulas from CD ROM video clips.

Suddenly multimedia has business application. Just don't tell your boss it's multimedia. That's like painting "expensive and useless" in Day-Glo orange on your purchase order. Call it "business audio."

That's what Compaq, Microsoft, and others start doing this month. Compaq is adding hardware for basic business audio applications to new PCs—free. This summer, Microsoft will reach out to installed PCs with cheap upgrade kits. *Windows 3.1* users already have the software to record, annotate, and play back voice messages, music, or other wave sounds from all OLE-compatible applications. The Lotus Sound recorder and Media Vision's palm-size Audio Port let you do that on the road, so the foundation for business audio is there.

Beyond that, a multitude of vendors plan to add sound to video cards, fax-modems, and almost every other type of I/O card for less than the price you've been paying for current hardware. For example, last year around this time 9600-baud fax-modem cards debuted for about $1000. Today, $400 will buy you a 50 percent faster 14.4K-baud fax-modem with hardware for answering machine and voice annotation thrown in.

A lot of companies will implement business audio with digital signal processors (DSPs)—general-purpose engines that will let you add algorithms for more advanced multimedia applications such as full-motion video, apps that obey voice commands, and spreadsheets that read numbers back to you.

You can sit back and be content with business audio, or you can get a little aggressive. Tell your boss you just gotta have one of AST's new MPC-compatible Advantage desktops so you can more clearly hear his voice annotations on the budget. You get a microphone and good speakers, not to mention a full multimedia-capable 486SX with a fast CD ROM drive thrown in for less than $2000. ALR, Acer, and Leading Edge are pushing the multimedia price premium toward the $300 mark.

Surely you can find a way to hide that in the budget. If not, hey, maybe it's finally time to reach into your own jeans for a multimedia-capable PC.

WHAT TO WATCH

Lotus's multimedia plans include a codeveloped product that could turn your telephone handset into a microphone and speaker .... **Prometheus's Ultima Home Office** half-card will bring a 14.4K-baud fax-modem, voice compression, and audio annotation together for a street price of $350 to $400 by summer's end .... Not Digicom (as reported in June), but its client **Cardinal Technologies** plans a $250 or so **DSP-based add-in board** for late August that combines a 14.4K-baud fax-modem, CD-quality audio, a CD ROM controller, voice compression, text-to-speech and speech-to-text synthesis, and room to grow into video .... In July, **Logicode** ships its 9624LP **pocket 9600-baud fax/2400-baud modem** that draws power from your portable, the phone, or its own rechargeable battery .... **Borland** is publishing the *dBASE* file format, making its bug lists available to third parties. Questions? Contact me at 415/267-1718, or MCI Mail, 329-2648.

Edited by RUSSELL GLITMAN

As CPU Choices Proliferate, Prices Drop

Cyrix, AMD prepare new processors in wake of Intel price cuts.

Users can look forward to cheaper, smaller, and less power-hungry desktops and portables this fall thanks to summer CPU introductions and price slashing by Intel, Cyrix Corporation, and Advanced Micro Devices.

In a significant escalation of the technology/price race, Intel will ship low-power versions of the 386SL on July 1 while slashing 486 chip prices by up to 58 percent. In the same time frame, Cyrix plans to launch a 32-bit 486 clone, the 486DLC, that is comparable to an Intel 486DX/25, and AMD will begin sampling a 486DX alternative of its own. Meanwhile, vendors with such familiar names as AST, Austin Computer, and Zeos International are preparing inexpensive desktop and notebook PCs with CPUs from all three.

Matching recent introductions by Cyrix and AMD, Intel will ship 3.3-volt 386SL versions that plug into current 5-volt designs. By tapping the 386SL's 3.3-volt capabilities, designers of portables could extend the battery life of full-size notebooks, halve their battery weight, and design smaller, lighter computers.

Cyrix's 486DLC handily beat Intel's 33-MHz 386DX but came up short against the slowest Intel 486DX. However, the chip's market acceptance will ultimately be influenced by its price.

Because they are compatible with current BIOS's, the new 386SL versions should ease the transition to power-stingy, 3.3-volt technology for an approaching wave of lighter, full-size notebooks, subnotebooks, pen-based PCs, and companion PCs. However, PC makers' plans are being hampered by a delay in other 3.3-volt motherboard components, according to representatives of BCC and AST—two companies that hope to have 3.3-volt notebooks out this fall.

Intel also plans new, smaller 486SX versions. These will be plastic-packaged, surface-mounted chips without a math coprocessor. Their smaller size and lower power requirements could enhance notebook designs and even lead to smaller desktop footprints.

Whatever PCs and notebooks appear will be far cheaper than today's designs. AMD and Cyrix representatives say their current chip prices are below Intel's planned third-quarter list prices, which have little to do with the street prices vendors pay anyway. Off-sheet price reductions have become ongoing, in part because of Intel's strategy of flooding the market with 486s, particularly 486SXs intended to obsolete its competitors' 386s. Sales of 486SXs will jump from 1.5 million units in 1991 to 3.5 million this year, the same amount as 486DXs, predicts Instat analyst Dean McCarron.

—*Mike Hogan*

dBASE for Windows Remains a Developer's Tool—For Now

The uniting of *dBASE* and *Paradox* under the same *Windows* interface begins in earnest this summer with the August release of *Paradox for Windows*. Originally slated for March, *Paradox for Windows* will sport Borland's new interactive Data Base Desktop *Windows* interface and make extensive use of object classes for the easy creation of queries, forms, and reports.

However, the first iteration of *dBASE for Windows*, which Borland president Philippe Kahn demo'd in beta form at his June data base conference, will be primarily a programmer's platform accessible through the dot prompt. Due this fall, it lacks the Data Base Desktop but will include a new integrated compiler, a debugger, and a number of other tools. An interactive version with the same interface as *Paradox for Windows* won't appear until sometime in 1993, says Borland vice president Rob Dickerson.

Still, like the *Windows* versions of *Paradox* and *Quattro Pro* (due out this summer), *dBASE for Windows* is built around Borland Object Component Architecture (BOCA), which enables all such applications to read each other's data files and those of their DOS antecedents. The reverse is not true for the DOS versions of *Paradox* and *Quattro Pro*, including the just-announced *Paradox 4.0*, which Dickerson claims will be 10 times as fast as version 3.5 and 30 percent faster than even *FoxPro* (recently acquired by archrival Microsoft).

Borland's entry into the *Windows* market is about two quarters overdue, estimates Sanford C. Bernstein & Co. analyst Mike Kwatinetz, and the delay has hurt first-half sales and profits as well as Borland's stock.

If Borland doesn't move posthaste, customer loyalty may erode. While awaiting *Paradox for Windows*, Rock Blanco, IS vice president for Garber Travel Service in Boston, "fell in love with *FoxPro*'s incredible speed." Blanco, who still considers Borland and its products "first-class all the way," uses a beta version of *Quattro Pro for Windows* as the front end for his 200 users to tap the corporate data base—but that's now a *FoxPro* data base. —*Mike Hogan*

Ami Pro Made Fast, Easy

Seeking to overcome *Microsoft Word for Windows'* dominance among *Windows* word processors, Lotus will soon ship an *Ami Pro* upgrade that will be much easier to use than past versions.

Ami Pro 3.0 promises to speed editing tasks by letting you drag and drop text—as do the latest versions of its Microsoft and WordPerfect rivals. Unlike its competitors, though, *Ami Pro* also offers "fast formatting"—the capability to apply formatting wherever you want with a single mouse click. Additionally, a single click of the right mouse button brings up controls for paragraph styles, page layout, and frames. And revamped dialog boxes make it much simpler to create and manage *Ami Pro*'s powerful SmartIcons.

While mail merge was clumsy in earlier versions, sources say *Ami Pro 3.0* will offer a smooth step-by-step approach and let you maintain your mail data files with a friendly card-file front end. It will also offer handy envelope- and label-printing capabilities.

The new release packs a grammar checker; a document viewer that lets you print, copy, and go to or find information within any document or file that *Ami Pro* can import; a handy style sheet previewer; a quick-start on-line tutorial; and a "clean screen" option that frees up screen space by letting you dispense with title bars, menus, SmartIcons, or other screen components. Due in July for $495, *Ami Pro 3.0* is expected to run noticeably faster than its predecessor.

But while *Ami Pro* has always battled hand to hand with *Word* (trading Best Buys as each successive version comes out) and is being pushed hard by Lotus, analysts doubt it will emerge from its third-place position behind alternatives from Microsoft and WordPerfect. *Word for Windows 2.0* is a very strong, well-marketed product, and "inertia is simply too strong among buyers," notes Computer Intelligence's Dan Ness.

—Eric Bender

A Hand-Held RISC Computer

The Personal Digital Assistant (PDA), a new type of hand-held computer device, is under development at Apple Computer Corporation and is expected to be available for under $1000 in consumer electronic and computer stores early in 1993.

The first PDA, called Newton, will be a RISC-based unit powered by four AAA batteries and capable of transferring data with *Windows*. It weighs less than a pound, relies on a pen rather than a keyboard, and measures less than 8 inches in length, approximately 4 inches in width, and less than 1 inch in height.

Newton promises to radically alter the way that we use and think of computers, according to analysts. "This is the first device that brings computing to the masses," says Tim Bajarin, president of Creative Strategies, a Mountain View, California, consulting company. "No other device will have as dramatic an impact on computing."

Newton comes with its own multitasking operating system. Applications include a note taker and a powerful equation editor (both of which use an advanced character recognition module), a unique drawing program, and a PIM—all of which are connected by an underlying object-oriented data base. An infrared device lets Newton users communicate with other Newtons.

An optional fax-modem is available for Newton, and the machine comes with its own built-in speaker.

—Russell Glitman

Apple is launching the era of Personal Digital Assistants with a RISC-based palmtop that can transfer files to Windows.

Gateway, Dell Show New Subnotebooks

A new breed of traveling computer will hit the market this summer: subnotebooks. Weighing 2 to 4 pounds, they are smaller and lighter than standard 6-pound notebooks, yet larger and easier to use than tiny palmtop PCs like Hewlett-Packard's 95LX and the Poqet PC. Most lack the internal floppy drive of notebooks but have a keyboard spacious enough for touch-typing.

Half the weight of standard notes, Gateway's HandBook runs 5.9 by 9.8 inches.

Among the first to ship is Dell Computer's new 320SLi, a 3½-pound, 1¼-inch-thick portable with a 60MB or 80MB internal hard drive and a reflective LCD screen; it will sell for about $2000 (see "The Lightest Notebook Yet").

Also due this summer is Gateway 2000's HandBook, a 2.7-pound subnote that's based on Chips and Technologies' PC/Chip—a single chip that integrates a 16-MHz 286 CPU with support chips that control video, disk storage, memory, and other functions.

Priced around $1300, the HandBook features a backlit CGA screen, 1MB of RAM expandable to 3MB, and an internal 40MB hard drive. The unit's battery lasts about 4 hours, according to Gateway.

Between 20 and 25 subnotes using the PC/Chip will reach the market before year-end, according to Hans Schwarz, director of product marketing for C&T's high integrations products group.

Hong Kong–based ABC Computer uses an AMD 16-MHz 286 in its new 2.2-pound, $1800 Bicom B240i, which has a nonbacklit LCD screen.

—Jeff Bertolucci

The Lightest Notebook Yet

Dell's full-function 320SLi notebook relies on a sidecar floppy and a reflective LCD to reduce traveling weight to 4.9 pounds.

The 320SLi weighs just 3.5 pounds. The floppy fits in your palm.

ROBERT CARDIN

by Mike Hogan

Years of engineering gymnastics have pretty much established the notebook as the bottom line for full-function portability. Still, Dell's System 320SLi has found ways to limbo down just a little lower.

Call it "Notebook Lite." At 3½ pounds and 1¼ inches high, the 20-MHz 320SLi is about 2 pounds lighter and a half-inch sleeker than Compaq's standard-setting LTE Lite/20.

Like other high-end 386SL-based notes, it comes with 2MB of RAM expandable to 10MB and your choice of the latest 19ms 60MB or 80MB—or even 17ms 120MB—hard drives. The 320SLi uses a nickel-metal-hydride battery to deliver a respectable 2½ to 3 hours of full-power usage between charges from a diminutive (4½ by 2¼ by 1½ inch) AC adapter.

Anatomy of a Portable

But as surely as the kneebone is connected to the shinbone, when a portable gives you a little something here, you give up a little something there.

With the 320SLi, you sacrifice an on-board floppy. Instead you get an external 1.44MB floppy whose cable snaps into the parallel port at the back of the machine (right next to the single serial, PS/2 mouse/external, keyboard, and external VGA monitor ports).

Despite research indicating that most people don't use a floppy on the road, sidecar floppies have doomed portables in the past. Still, the 320SLi's new palm-size floppy is pretty slick. It fits in a suit pocket or in a special sleeve on the side of the 320SLi's nylon case. Together with the 10.4-ounce AC adapter, the 12-ounce floppy brings this note's traveling weight to a mere 4.9 pounds—compared with 5.8 pounds for the next-lightest portable, NEC's UltraLite III.

Lights Out

Dell's other compromise is in screen lighting. There isn't any. The 320SLi uses Sharp's new reflective LCD, whose power consumption is just 10 percent of overall system draw—compared with 40 percent for most lighted notebooks. So keep the display on all the time, even while powering down the other components. That way your screen won't dive into a coma if you ponder your spreadsheet for a few minutes without a keystroke—particularly annoying when running a *Windows* application.

The Sharp display offers the same 9½-inch diagonal measurement, 12:1 contrast ratio, and 64 gray shades at VGA resolution found on most of today's lighted monochrome displays. As long as you're under a good overhead light (even an airplane reading light), the 320SLi screen is sharp and clear. In the bright outdoors, it's even easier to read than lighted displays. But obviously, it can't match them in dim environments.

Nonetheless, turning out the lights and the additional battery mass needed to power them is what lets the 320SLi slim down to about the height of a pair of *PC Worlds*.

The 320SLi asks for no sacrifices in its keyboard. Dell shaved peripheral keys such as <Backspace> and <Shift> a bit. Otherwise, you get a full-size, AT-style keyboard with 3mm keystroke travel.

The 60MB 320SLi has the same $2000 price as Dell's 25-MHz NL25, and its features don't stand up against other 386SL notebooks'. So? Mazda's Miata doesn't fit a family of four, but does that stop you from wanting one?

Like the Miata, the 320SLi is one sexy machine—sleek, black, with a buff, rubberized aluminum case that just feels good. You'll love it or leave it.

Mike Hogan is a senior editor for PC World.

SNAPSHOT

Dell System 320SLi

The 320SLi's reflective display and external floppy make it as thin and light as portables come—or go.

KEY FEATURES

- **3½ pounds without external floppy, 4.9 pounds travel weight**
- **11 inches wide, 7¾ inches deep, 1¼ inches high**
- **9½-inch (diagonal) nonlit LCD supporting 64 gray scales in VGA**
- **Nickel-metal-hydride battery runs 2½ to 3 hours off one charge**

AVAILABILITY

Immediate

PRICING

At press time, 60MB model $1999, 80MB model $2199

Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX 78759-7299
800/289-3355

Reader service no. 760

Paradox Gets a Graphical Face-Lift

With version 4.0, Borland speeds up its DOS data manager and adds memos, movable windows, and mouse support.

by Lincoln Spector

Remember when the *Paradox* interface was the latest in ease of use? That same interface looks a little long in the tooth now. Borland's revamped *Paradox 4.0* arrives not a moment too soon.

Paradox 4.0 has a decent character-based imitation of a graphical user interface. Submenus drop down when selected, and tables and forms appear in movable, resizable, scrollable windows. The menus use the old *Paradox* structure, making them keyboard compatible with older versions. (If you like, you can use *Paradox*'s old interface instead.)

With *4.0*, *Paradox* supports variable-length memo fields at last. You have 64K per record for text if you want to describe products in detail or keep extensive notes on customers, and you can search memo fields for words and phrases when you query tables.

Paradox 4.0 also supports variable-length, variable-*type* data. You can store a *WordPerfect* document, a *PC Paintbrush* image, or just about any other type of data as part of a record. *Paradox* will bring up your predefined application whenever you need to create, edit, or view this data, which is stored in its native format within the *Paradox* table. The bad news: You're restricted to data from one non-*Paradox* application for all your tables.

Borland has also improved its report writer. When you send a report to screen, *Paradox* brings it up inside a window, and you can scroll through it to examine all your data before you print. And you can now send *Paradox* reports to PostScript printers.

Programmers will find that their old *Paradox* applications run fine in *4.0*, but they'll also have over 50 new commands to play with. Most of these make use of the new interface tools.

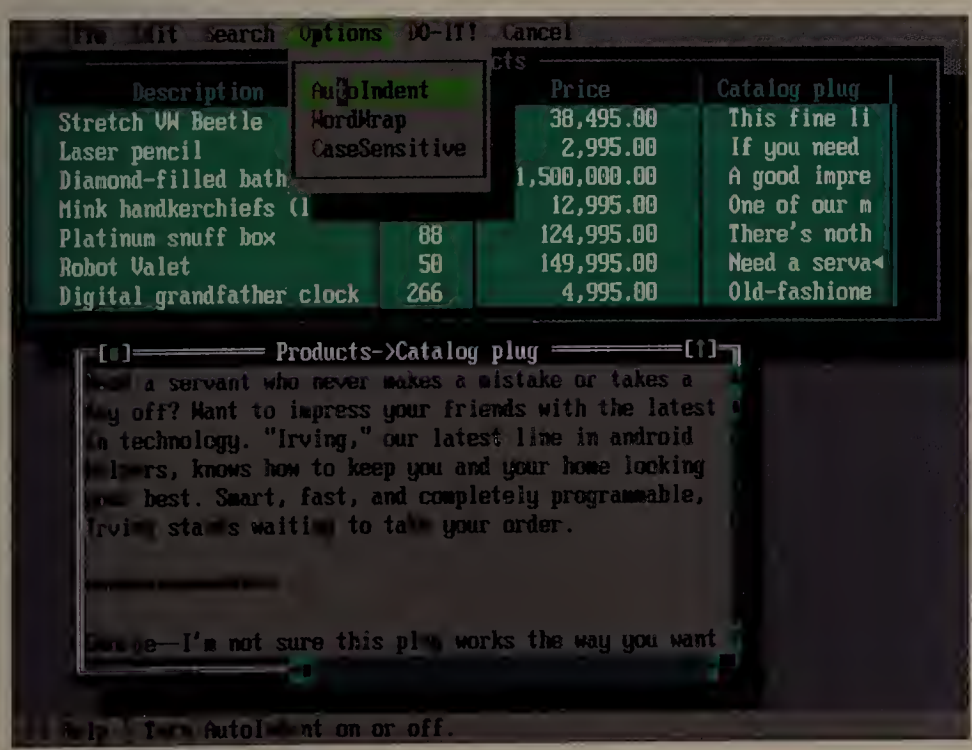
Some major improvements are under the hood. *Paradox 4.0* can use VCPI or DPMI extended memory to improve performance, although it prefers DPMI. In fact, *Paradox* comes with its own DPMI driver, which loads transparently if there isn't an extended memory driver already in use. According to Borland, *Paradox 4.0* is two to three times faster than *3.5*—ten times faster in some operations.

The new *Paradox* has more versatile indexes, so it's faster and easier to use. You can combine multiple fields in a secondary index in order to, for example, index on State and Salary so all your Arkansas clients are together but listed by salary. Better yet, you can use these indexes to instantly change the order in which you view a table on screen: Just press three keys, move the cursor to the column you wish to sort on, and press <Enter>. If there's an index on that column, *Paradox* will use it; if there isn't, *Paradox* will make it. If that column is used in more than one index (for instance, the Last Name column might be used in ZIP Code + Last Name and Last Name + First Name indexes), the program will let you choose which to use.

Paradox 4.0 handles network queries more intelligently than before. Previously, if someone updated a network table while you were querying it, *Paradox* abandoned your query and started it over. This meant your information was up to date, but if people continually entered or changed data, you might not get any information. The new *Paradox* lets you turn this feature off, so you can decide between speed and absolute accuracy.

You'll find *4.0* isn't as mousable as it could be. Its form and report designers are particularly disappointing. True, you can select a field by pointing and clicking—except when the program is prompting you to select a field. And you must use the keyboard's cursor keys to move or resize fields. But two-thirds of a mousable interface is better than none. With *4.0*, Borland has answered most complaints about *Paradox*. They've taken a great product and made it better.

Lincoln Spector is a PC World *associate editor.*



The new Paradox memo fields give you plenty of room for product descriptions, correspondence, and anything else in text form.

SNAPSHOT

Paradox 4.0

The best-selling data manager sports a new interface and other improvements.

KEY FEATURES

- **Mouse support**
- **Scrollable, resizable windows**
- **Memo fields**
- **Language extensions**

AVAILABILITY

Immediate

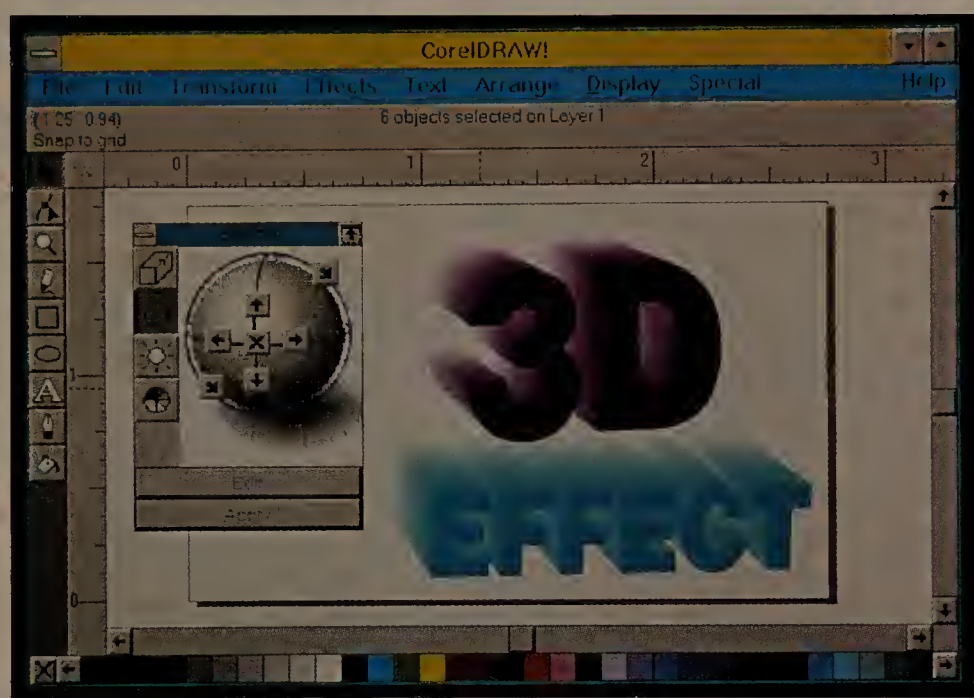
PRICING

$795; upgrade $179.95 for first 90 days, then $199.95

Borland Intl. Inc.
1800 Green Hills Rd.
P.O. Box 660001
Scotts Valley, CA
95067-0001
800/331-0877,
408/438-8400
Reader service no. 761

CorelDraw Grabs the Lead

Enhanced text and draw features join chart and paint functions.



One of CorelDraw's nifty innovations is the roll-up palette. The Extrude roll-up will rotate an image in three dimensions.

by Christina Wood

With the recent appearance of *Aldus FreeHand* and *Adobe Illustrator* on the PC scene, everybody's favorite draw program, *CorelDraw*, started to show its age. No more. With version 3.0 of *CorelDraw*, Corel gives us almost everything we want: editable preview, the ability to enter text directly into a drawing, a spelling checker, a thesaurus—even bundled paint, chart, and multimedia presentation packages.

CorelDraw 2.0 was justly celebrated for its proficiency at handling text; version 3.0 is even better. New options let you align text on a curve, and you can even do manual kerning on a curve (although the program won't automatically kern on a curve the way *Illustrator* does).

CorelDraw still offers 153 fonts, but they've been converted from Corel's proprietary WFN format to TrueType. TrueType can be used in all *Windows 3.1* applications. PostScript fans will also appreciate getting *Adobe Type Manager*, which Corel has thrown in for free.

It looks like Corel studied the competition and incorporated their best features. As with *FreeHand*, you can create multilayered drawings and make each layer nonprintable, invisible, or locked. But *CorelDraw* also lets you draw on the guide layer to create custom guides so that you can have shapes snap to, say, a circle. The program's skills here are limited, however. It will snap to only four points of a circle, while *Illustrator* will align an object with any point on a circle. *CorelDraw* and *Illustrator* are the only programs that support custom guides, but *Illustrator* won't do multiple layers.

Like *FreeHand*, *CorelDraw* allows you to edit the shape and color of a blend. But *CorelDraw* lets you blend along an editable path—the only PC program with such a talent.

CorelDraw doesn't offer a way to create and apply tile patterns within a document as *FreeHand* and *Micrografx Designer* do. You can, however, save any image and import it as a fill pattern. Although this method is not as convenient, it gives you unlimited options. *CorelDraw 3.0* also rotates objects in three dimensions and provides one light source for primitive rendering.

Among *CorelDraw's* nifty innovations are roll-up palettes, which work somewhat the way window blinds do. When rolled up, they look like tiny tubes, and you can move them around the screen. Click on them, and they unroll. Each presents a family of menu selections: Blends, Extrude, Text, or Layers.

It Doesn't Just Draw Anymore

While *Arts & Letters* and *Illustrator* have chart tools, CorelChart is a dedicated program that rivals *Harvard Graphics* in capabilities. It offers an astonishing selection of chart types, including 3-D scatter, spectral, and histogram, and can even rotate a chart in three dimensions.

Once you've touched up your scanned or bit-mapped images in CorelPhotoPaint—Corel's version of ZSoft's *PhotoFinish*—you can pull them into the presentation module, CorelShow. Taking advantage of *Windows 3.1*'s Object Linking and Embedding (OLE) capability, CorelShow accepts charts, drawings, and even sound, video, and animation to create multimedia presentations. Rounding out its multimedia capabilities, *CorelDraw* includes a CD ROM with 50 animation sequences and a library of 10,000 clip-art images.

CorelDraw is still unable to do real masking, a surprise since this has long been available in *Designer*. And while version 3.0 has more color options than version 2.0 did, professional designers may favor the high-end color control of *FreeHand* and *Illustrator*.

Still, this is a remarkable upgrade. With a lowered price ($595, registered users upgrade for $149), it's easily the best deal available for all but the design professional.

Christina Wood is an assistant editor for PC World.

SNAPSHOT

CorelDraw 3.0

WINDOWS Endowed with paint, chart, and presentation capabilities, this upgrade of the leading PC draw package is a stunning example of increased power and decreased price.

KEY FEATURES

- **Built-in paint, presentation, and chart modules**
- **Editable preview**
- **Lets you enter text directly onto a drawing**
- **Powerful layering**
- **Editable blend on a curve**
- **OLE client and server**

AVAILABILITY

Immediate

PRICING

$595, upgrade for registered users $149

Corel Systems Corp.
The Corel Building
1600 Carling Ave.
Ottawa, Ontario
K1Z 8R7 Canada
800/836-3729,
613/728-9790 (fax)
Reader service no. 745

Microsoft Mail 3.0: Third Time's a Charm

Drag and drop, global addressing, and a spelling checker makes E-mail a pleasure.

by Bronwyn Fryer

Three must be Microsoft's lucky number. *Windows 3.0* took a giant leap over its predecessors; likewise, the third generation of Microsoft's *Mail for PC Networks for Windows* makes its ancestors—and other *Windows* E-mail packages—seem, well, dated. Redesigned from the ground up for better performance and usability, the *Windows* version lets you drag and drop names, folders, and files; select from a global address list; attach OLE objects; check the spelling of your messages; and more.

The improved *Windows* interface now includes such clever icons as a mail slot to show you incoming or outgoing messages and an out-box that looks like the one on your desk. A split screen lets you see all your mail folders and addressees at once; to place a message in a folder, just drag it over and drop it in. You can drag folders around to rearrange them, or put them inside one another. A plus sign tells you if a folder contains more folders, much as the outliner in *Word* reveals subtexts. To be a name dropper, just drag a name from the address list into the To: box.

Clicking on an Address button gives you a graphical view of a global address list that can include addresses from other mail systems; typing a few letters will take you to the alphabetical area of your addressee's name or find an exact match. When you want to find all the messages from Joe in Sales, the Message Finder function in the File menu will search for them. This feature also lets you filter incoming or existing messages by subject, sender, or content, so you can tell it to automatically file all messages from your boss in an "Urgent" folder. As in previous versions, you can set up a personal address list and store phone numbers and other details about addressees. One installation option even lets you send mail directly from within *Windows* applications.

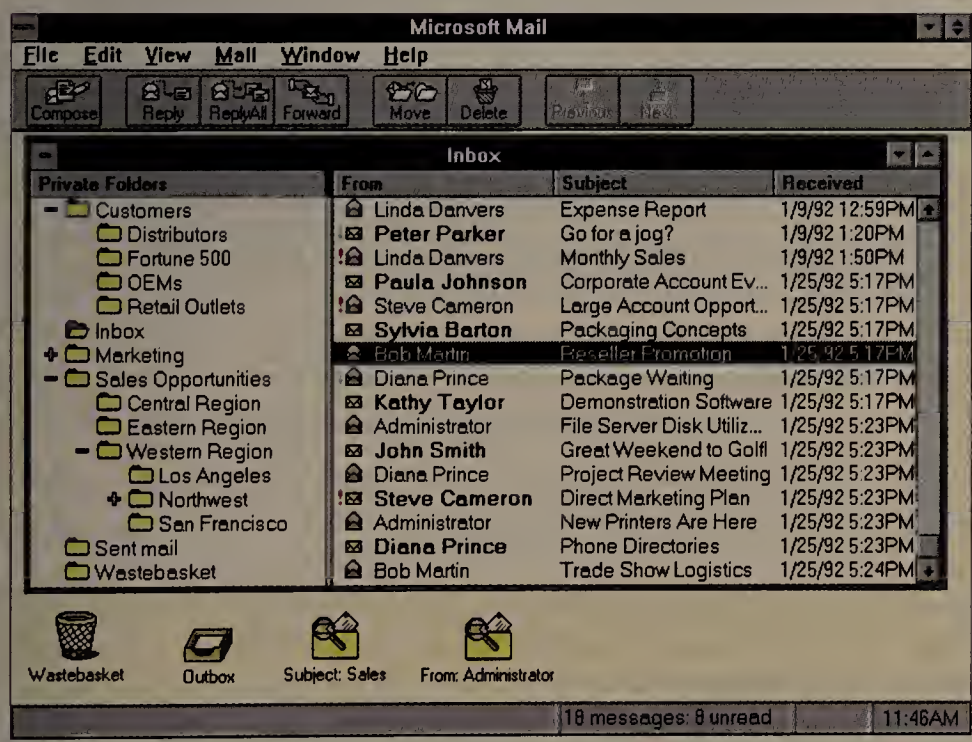
You can put file attachments anywhere in the message and embed charts, pictures, tables, and even sounds in your mail messages. When you embed an object, you can send it across the mail backbone without any loss of data integrity. Recipients can automatically launch the appropriate application and load the attached file from *Mail 3.0* by double-clicking the icon on the file attachment. You can customize the program to include forms you use in your office or to execute special tasks, such as looking up a master price list.

Mail 3.0's built-in spelling checker uses the same dictionary as *Microsoft Word*, so new words get added to the same pot. If you're the type to delete messages and regret it later, the package stores deleted messages in a Mac-like Wastebasket, so you can get them back until you empty the trash. Storage is limited only by the size of your server's hard disk. And chances are you won't lose incoming messages even if a mail server goes down, since *Mail 3.0* knows whether you've received a message.

Remote users can tap into *Mail 3.0* even if they're not hooked up to the network. Noncritical messages are stored in the out-box until the laptopper is back in the office. Optional fax, MCI, and X400 Gateways and several other gateways are available from Microsoft.

Mail 3.0 is currently available for *Windows* and OS/2 clients, with DOS and Mac upgrades soon to follow. Since *Mail 3.0* complies with MAPI E-mail standards, Microsoft is betting that it will be a good platform for mail-enabled applications of all stripes. In the meantime, the *Windows* version looks like a hands-down winner—it's everything that a *Windows* E-mail package should be.

Bronwyn Fryer is an associate editor for PC World.



Microsoft's Mail 3.0 uses a split screen so you can drag incoming mail items and drop them in a folder. New icons make an attractive interface.

SNAPSHOT

Microsoft Mail for PC Networks 3.0 for Windows

WINDOWS This rebuilt version of Mail leads the way for Windows E-mail packages with a brand-new, graceful interface and powerful features to make office communication easier.

KEY FEATURES

- **Drag-and-drop capability**
- **Global address list**
- **OLE support**
- **Message finder for filtering messages**
- **Built-in spelling checker**

AVAILABILITY

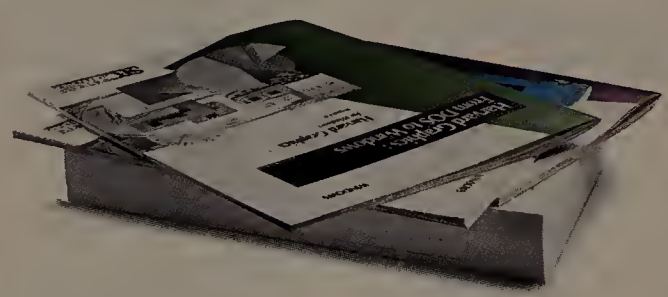
Immediate

PRICING

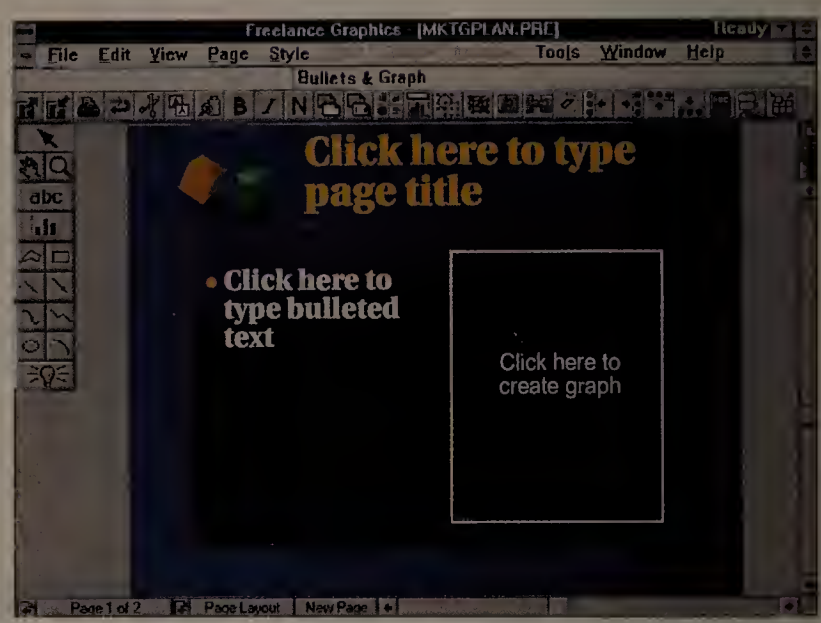
$695 for server and 10 workstation licenses; workstation licenses available in 5 packs ($395), 20 packs ($1349), 100 packs ($5550), 500 packs ($22,500); gateway prices available from Microsoft

Microsoft Corp.
One Microsoft Way
Redmond, WA 98052-6399
206/882-8080,
206/936-7329 (fax)
Reader service no. 755

The trouble with Harvard is you need too much education to get into it.



Harvard Graphics for Windows



Freelance Graphics for Windows

Suppose you had to create a presentation for a meeting tomorrow. Why choose Freelance Graphics?

Well, Byte Magazine (2/92) "put together a moderately complex real world presentation within half an hour of installing the package." PC Magazine (3/17/92) called Freelance Graphics™ for Windows™ "simply the best on the market."

PC MAGAZINE EDITORS' CHOICE 3/17/92

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PC WEEK SHOOT-OUT WINNER 4/13/92

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Lotus Freelance Graphics for Windows

In Canada, call 1-800-GO-LOTUS.

* Usability Sciences Corporation. Freelance Graphics for Windows vs. Harvard Graphics for Windows, January 1992.

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Edited by RUSSELL GLITMAN

Gateway Goes on the Road

From an Intel 486DX to an AMD 386SX, these bargain notes offer large-capacity hard drives and weigh less than 6 pounds.

Gateway 2000 launches its Nomad notebook line with three powerful yet lightweight road machines. The Nomad 486DX25 features 4MB of RAM and a 120MB hard drive and costs $3495.

Best known for its competitively priced desktop PCs, direct marketer Gateway 2000 is entering the notebook PC market with three new notes that offer a range of portable computing power.

Gateway's first series of notebooks, the Nomad line, includes Intel 486DX/25 and 486SX/20 models and an AMD 386SX/25 model. Each unit weighs just under 6 pounds and has the same slim 11-by-8.5-by-1.8-inch shell. The 486 units come with DOS 5.0 and *Windows*; the 386 has DOS 5.0 only. You'll notice the Gateway notebooks' striking resemblance to Texas Instruments' TravelMate line—not surprising, since TI manufactures the Nomad for Gateway.

For travelers who don't want to compromise when it comes to power and performance, the $3495 top-of-the-line Nomad 486DX25 offers Intel's speedy 25-MHz 486DX chip for desktoplike spreadsheet recalcs, 4MB of RAM (expandable to 20MB) for solid *Windows* performance, and a 120MB hard drive for plenty of storage space. While the slower $2795 Nomad 486SX20 lacks the DX's math coprocessor and comes with only an 80MB hard drive, Gateway provides the same 4MB of RAM plus the power management and video enhancements of the DX unit.

Combine an industry-standard nickel-cadmium battery with a power-hungry 486, and you're searching for an AC outlet every few minutes, right? Not so, says Gateway, which claims its DX and SX Nomads offer at least 3 hours of computing time from a single charge—more if the Nomad's power management features are enabled.

The power enhancements are built into the circuitry on the main board. You'll also find various power-saving features in Gateway's *Battery Pro* software. Where some notebooks with Intel's power-saving 386SL chip may use up to 20 milliamps to refresh the RAM, Gateway officials claim the Nomad uses just 3 milliamps—a considerable power savings. The Nomad also has a suspend mode that automatically shuts down power-hungry components while you take a break. An additional power-saving assist comes from a hot-key command that lets you power down the system while retaining your application and data in RAM.

The displays of the Nomad notebooks are comparatively standard—10-inch, black-and-white, backlit LCDs. The Nomad 486 models include 1MB of video RAM (the 386 has 256K), designed primarily to speed up video performance on an external monitor, especially with graphics-intensive programs such as desktop publishing and CAD. Furthermore, both 486s, but not the 386SX, display video simultaneously on the LCD screen and an external color monitor. The video driver displays up to 256 colors at a maximum 1024 by 768 resolution on an external monitor, but only 640 by 480 resolution (standard VGA) on the LCD screen.

Gateway plans to sell its 486 Nomads as notebook/desktop solutions for users who want just one PC. You'll be able to buy a Nomad with an external monitor, keyboard, and docking stand. Pricing for that unit had not been set at press time. Bundled with each 486 Nomad is Appoint's Thumbelina handheld trackball.

If 486 power is more than you need, the Nomad 386SX25 offers some impressive features for $1995. These include 2MB of RAM (expandable to 6MB) and an 80MB hard drive. Gateway claims the 386SX model will run at least 3½ hours off a single charge.

—*Jeff Bertolucci*

IN BRIEF

Nomad 486DX25, 486SX20, 386SX25

Gateway 2000's first line of notebooks offers power, advanced battery management, and a host of other impressive features.

Gateway 2000 Inc.
610 Gateway Dr.
North Sioux City, SD 57049
800/523-2000,
605/232-2023 (fax)
Reader service no. 690

Dell's NL25, a Low-Cost, Back-to-Basics Notebook

Priced at $1999, the Dell System NL25 is a no-nonsense note for buyers who don't want a lot of fancy extras. Still, it features Intel's power-saving 386SL/25 CPU, 64K RAM cache, 60MB hard drive, and 2MB of RAM.

Dell Computer had simplicity in mind when it designed its new 386SL notebook. Priced at $1999, the Dell System NL25 is made for the business traveler who wants an inexpensive, dependable notebook computer that gets the job done.

No built-in trackballs or exotic battery technologies here—just the basics. Starting with Intel's power-saving 25-MHz 386SL microprocessor, Dell throws in a 64K RAM cache to boost performance and adds 2MB of RAM (expandable to 8MB), a 60MB hard drive, one 3½-inch floppy drive, and a removable nickel-cadmium battery. The result: a lot of PC for about two grand. The NL25 with an 80MB hard drive costs $2199.

Weighing in at 6.3 pounds with battery, the NL25 measures 8.3 by 11 by 1.8 inches—an average-size notebook. Dell claims the NL25 can operate for about 2½ hours on a single battery charge with no power management features enabled. You can increase battery life by using the notebook's suspend mode to power down when you take a time-out. Also, the power management capabilities of the 386SL chip can turn off various internal components (such as the CPU and the hard drive) when you're not using them.

The System NL25 includes a 9½-inch monochrome VGA display and an 85-key keyboard with an embedded numeric keypad. The sidelit screen displays up to 32 shades of gray and also supports EGA and CGA resolutions. The machine supports an external VGA monitor at up to 800 by 600 resolution. The NL25 has room for an internal 2400/9600-baud fax-modem and a math coprocessor socket for on-the-road number crunching. Other essentials include serial, parallel, and VGA ports and a multipurpose port for a mouse, external keyboard, or numeric keypad. You also receive Dell Computer's highly regarded toll-free technical support and return-to-factory service.

While the Dell System NL25 may not win a feature-by-feature comparison with more expensive SL notebook PCs, this machine's got the right stuff to please price-conscious consumers.

—Jeff Bertolucci

IN BRIEF

Dell System NL25

A low-cost 386SL notebook that offers a lot of impressive features for the money.

Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX 78759-7299
800/289-3355,
800/727-8320 (fax)
Reader service no. 691

A Color Printer for All Reasons

When it comes to printers, these days, the question often isn't whether to buy a color printer, but which kind to buy and for whom. You could buy an ink jet for the marketing department, a thermal unit for your package designers, and a pen plotter for your engineers. Or get Hewlett-Packard's PaintJet XL300 and satisfy them all.

Business users will appreciate the HP's laserlike 300-dpi text and capability to print on plain paper, fancy bond, or transparencies. Support for Pantone colors and 11-by-17-inch pages make it an ideal color-proofing device for designers. And its HP-GL/2 plotter language comes in handy for CAD users and other techie types.

The $3495 color ink jet comes with 13 scalable fonts and accepts standard LaserJet cartridges. Because it uses a color version of HP's PCL 5, it can print existing LaserJet III documents without a hitch. A PostScript Level 2 model with 35 fonts costs $4995 and will be available late this summer.

The XL300 features a fast RISC processor and 2MB of RAM (6MB for PostScript), expandable to 18MB. But it's still pretty pokey—you'll need 1 to 2 minutes per text page and 1½ to 6 minutes for color graphics.

Because it uses four separate color cartridges, the XL300 prints real black text along with your color charts. HP estimates that consumables will cost about 4 cents for a monochrome page and 18 cents for color (at 15 percent coverage).

The XL300 switches automatically between its parallel and RS-422 serial ports—essential for sharing the printer between PCs and Macs—and accepts HP's JetDirect cards for fast data transfer over Novell or Ethernet LANs. A 200-sheet paper tray is standard. The XL300 has 14 bitmapped fonts as well as 13 scalable ones. Unlike HP's DeskJet 500C, it uses real blacks when mixing text with color charts. *—Daniel Tynan*

IN BRIEF

HP PaintJet XL300

With its sharp 300-dpi text and B-size output, HP's newest PaintJet may be all the color printer you need.

Hewlett-Packard
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900
Reader service no. 692

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Manufacturing Company, Inc.
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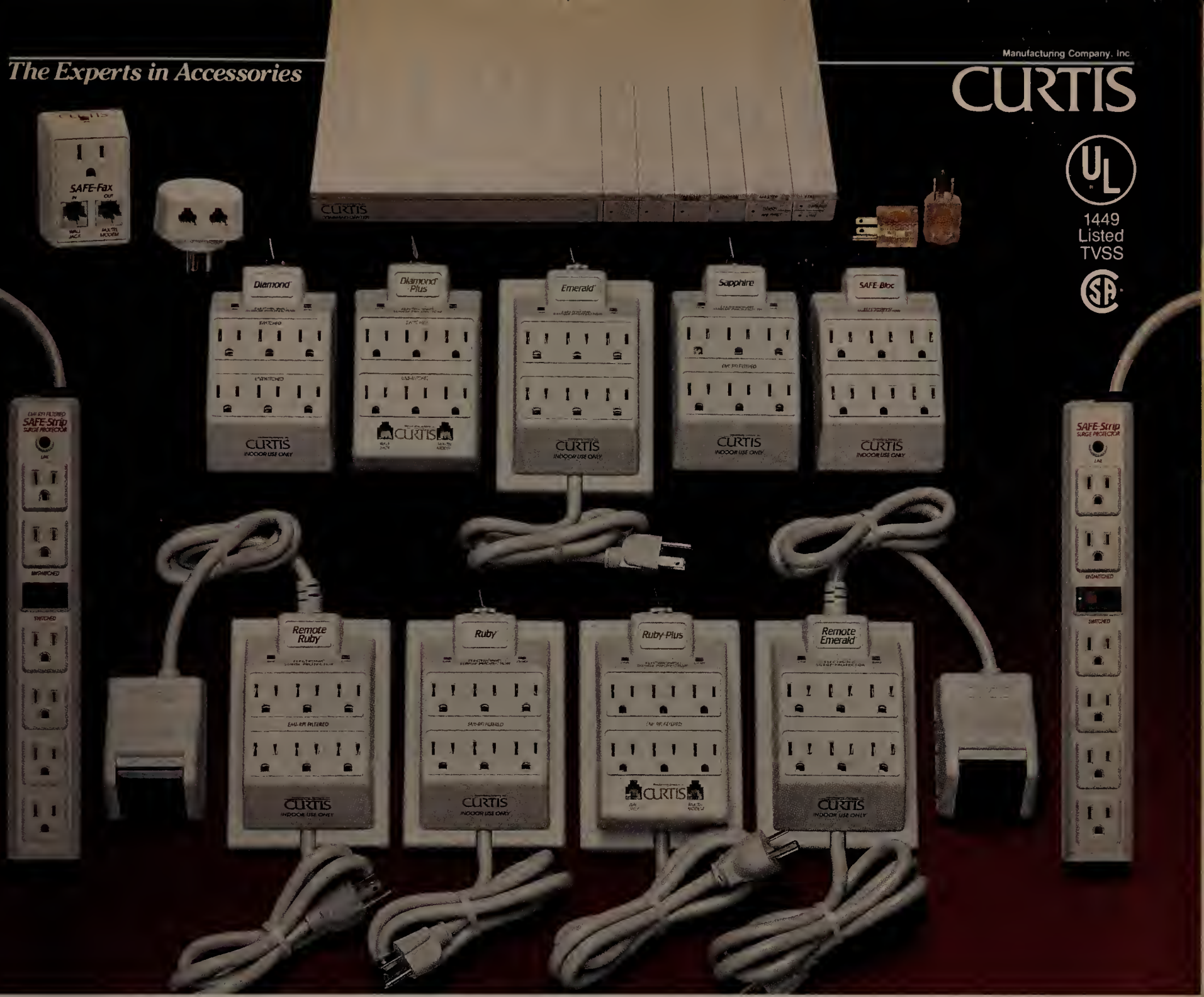

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When it comes to protecting their valuable data and electronic equipment, more computer users rely on Curtis surge suppressors than any other brand. Here's why:

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Manufacturing Company, Inc.
CURTIS

30 Fitzgerald Drive, Jaffrey, NH 03452-1931

*Surge protectors are not lightning arrestors and cannot be guaranteed to protect against direct hits.

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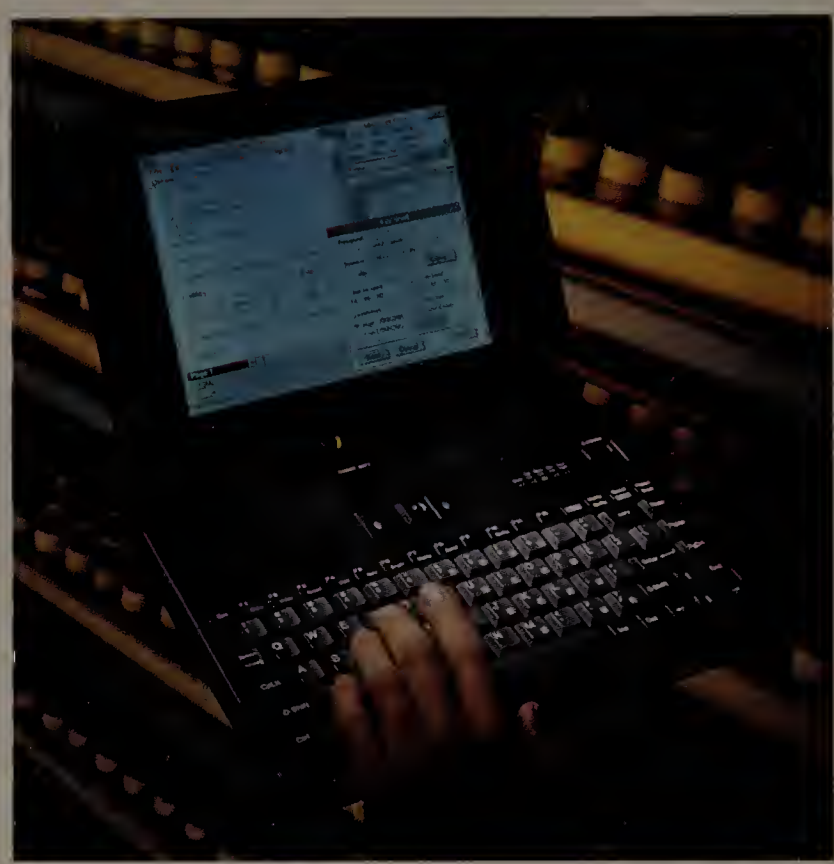
Grid 1660: A Sturdy SL Note for Office or Road

With its rugged yet lightweight design, built-in trackball, and magnesium-encased LCD screen, the Grid 1660 notebook has what it takes to be a successful road warrior. Throw in the 200-pin AT bus connector and optional docking station, and the 1660 becomes a respectable desktop unit too.

Intel's energy-saving 25-MHz 386SL chip and a performance-boosting 16K RAM cache make the Grid 1660 both power conserving and fast. Grid estimates that the 1660 offers an average of 3 hours of computing under typical operating conditions. A suspend/resume button turns off components not in use, including the screen and hard drive, and brings you back into your application at the touch of a key. A removable nickel-hydride battery won't suffer from the problems that plague conventional nickel-cadmium batteries, which, after repeated short-term use, can erroneously warn you they are low on power even when they are fully charged.

Grid PCs are known for their rugged design, and the pricey 1660 is no exception. The notebook's 10-inch LCD screen is encased in magnesium to help prevent what Grid officials say is an all-too-common catastrophe: users dropping objects on the back of their displays and damaging them. Despite its sturdy design, however, this notebook weighs only about 6 pounds with battery.

The 1660 comes with a tiny built-in trackball located between the keyboard and the screen. While useful for running *Windows* on the road, some may find it too small to be effective, and its central location above the keyboard can strain your wrist with extended use. Others, however, will appreciate the convenience of an integrated pointer.



Expensive yet rugged, the $3995 Grid 1660 note offers unique enhancements, including a magnesium-encased LCD screen.

When it comes to the sidelit LCD VGA screen, text and graphics appear sharp and crisp, and contrast is excellent, thanks in part to 4-inch fluorescent tubes that provide clear, even lighting across the entire screen.

As a desktop alternative, the 1660 uses a 200-pin AT bus connector to link to an optional docking station with room for one full-length and one half-length AT board—far less than the expansion capabilities most people take for granted in a desktop PC.

Standard configuration includes 2MB of RAM, expandable to 20MB, a 125MB hard drive, and a 3½-inch floppy drive. Options include a 25-MHz 387 math chip and an internal Hayes Smartmodem for sending and receiving faxes and data. Priced at $3995, the Grid 1660 is among the more expensive SL notebooks, but you get a rugged four-by-four machine that travels well.

—Jeff Bertolucci

IN BRIEF

Grid 1660

A pricey, rugged 386SL notebook that features a magnesium-encased LCD screen and a built-in trackball.

Grid Systems
47211 Lakeview Blvd.
Fremont, CA 94537
510/656-4700
Reader service no. 695

Paradise Graphics Accelerator

Western Digital's new Paradise Accelerator Card for Windows is tailor-made for *Windows* users who are sick and tired of slow graphics performance. This souped-up card performs normal video adapter functions, plus it has specialized hardware to take over some graphics processing usually handled by the CPU. By easing the CPU's burden, the accelerator board improves both graphics performance—the document scrolls with the mouse—and overall system speed.

With the Paradise accelerator, cursor operations and bit-block transfers (which especially affect scrolling, opening and resizing windows, and pulling down menus) are offloaded from the CPU. Western Digital claims that these two functions account for over 70 percent of graphics processing. The board also employs linear addressing, an improved memory handling scheme that puts each screenful of data in contiguous areas of video memory instead of in fragmented blocks.

The board supports a wide range of resolutions, including 800 by 600 (32,000 colors) and 1280 by 1024 (16 colors), and has a VESA-compatible 72-Hz refresh rate at 1024 by 768 (256 colors). It comes with 1MB of memory and Western Digital's CS90C31 processor.

What sets this board apart from the slew of competitors is its price—$349—and ease of use. The board comes with software utilities that let you switch resolutions and change your configuration in *Windows*. Western Digital has also established a helpful customer-service BBS. *—Dan Miller*

IN BRIEF

Western Digital Paradise Accelerator Card for Windows

WINDOWS An inexpensive way to improve Windows graphics performance.

Western Digital Corp.
8105 Irvine Center Dr.
Irvine, CA 92718
714/932-4900
Reader service no. 693

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For a limited time, we're making it easy to upgrade to Typecase. If you're using any competing font product, call us and we can upgrade you to Typecase for $49.95 plus $7.00 for 2nd day air shipping—a $50.00 savings off the retail price. You get 130 TrueType fonts, Typecase font management software, a bonus PC Keys™ TrueType font and no headaches. Typecase is backed by our 60 day no-questions-asked money-back guarantee for complete satisfaction.

Call (800)237-9383 to order, or for the name of an authorized dealer. This introductory offer has been extended through July 31, 1992, so don't be left out. Tap the full power of Microsoft TrueType—order your copy of Typecase today!

Swifte

† Offer good for current licensees of Adobe Type Manager®, Bitstream® Facelift™, Morefonts™, Atech PowerPak for Windows™, Hewlett-Packard® Soft Fonts and Printer Font Cartridges, and other Printer Font Cartridges used. Special Upgrade Offer expires July 31, 1992. Limit one per customer. Reseller prices may vary. Offer good only in the United States and Canada. Regular Typecase retail price: $99.95. ©1992 SWFTE International, Ltd. All rights reserved. Microsoft Windows™ and Microsoft TrueType™ are trademarks of Microsoft Corporation. Adobe Type Manager is a trademark of Adobe Systems. SWFTE International Ltd., Stone Mill Office Park, 724 Yorklyn Rd, Hockessin, DE 19707. For more information call (800)237-9383. In DE (302)234-1740. Fax (302)234-1760.

Circle 292 on reader service card

The Designer Driving Machine: NCR's System 3170

NCR's new System 3170 Notebook Computer—the successor to AT&T's Safari NSX/20—is among the most versatile and distinguished-looking portable PCs on the market. At a list price of $5399 for a fully loaded system with an 80MB hard disk and 2MB of RAM, NCR's 4.9-pound, 25-MHz 386SL notebook is a couple thousand dollars less than a top-of-the-line 486-based active-matrix color notebook, but it's on the pricey side for a monochrome model. Designed for mobile professionals whose jobs depend on high-powered computing and reliable communications on the road, the System 3170 Notebook Computer offers a full range of high-performance features and options, including a portable but hefty desktop docking station with an optional radio frequency modem that's designed to keep traveling executives in the loop.

This Mercedes-Benz of notebooks is 50 percent faster than the Safari NSX/20, 30 percent lighter, and 25 percent smaller. NCR achieved the speed increase by complementing the System 3170's faster 25-MHz 386SL CPU with a 64K memory cache. The monochrome screen is another improvement. Though smaller at 9.5 inches, the sidelit, triple supertwist LCD has twice the brightness and a higher contrast ratio (15 to 1), which make it one of the most readable monochrome notes.

The unit comes with 2MB of RAM (expandable to 16MB); a fast, 16ms hard drive (80MB or 120MB); a PCMCIA 2.0 slot (a new standard for adding third-party options such as network cards); an integrated 2400/9600-baud fax-modem (the 80MB has V.42, while the 120MB hard drive comes with V.32) with cellular capability; and a complement of bundled software and utilities, including *Windows 3.1*.

The 3170's light weight and trim form—11 by 8.1 by 1.8 inches—was achieved less by engineering genius than by common sense. NCR carved out the notebook's 3½-inch floppy drive and made it a 1-pound external unit. The new note has only a single 3-hour battery, a limitation that is overcome by using the unit's optional expansion chassis.

The Expansion Manager, a hefty docking station option, is $999 and comes with an AT expansion slot, a half-size XT slot, and ports for connecting to printers, keyboards, and AC power. Fully loaded, the 3170 with the Expansion Manager weighs in at 15 pounds.

Another minor innovation is the 3170's built-in Finger Mouse, a circular key that pivots, allowing mouselike cursor control with a single finger. Two buttons on either side serve as mouse buttons.

While somewhat pricey, the 3170 offers a lot of options and in its bare-bones configuration is among the lightest full-powered notes you can buy.

—Rob Garretson

IN BRIEF

System 3170 Notebook Computer

A new state of the art in portable design and flexibility, configurable from 5 to 15 pounds with almost any option imaginable.

NCR Corp.
1700 S. Patterson Blvd.
Dayton, OH 45479
513/445-5000
Reader service no. 762

Tandy's Low-Priced 386SX

Tandy's latest midrange desktop entry is a 386SX system running at 25 MHz. Although it's not the fastest system around, its low price—$1299.95, plus the cost of a monitor—makes this machine a candidate for a home system or nondemanding business workstation. Home users will appreciate the bundled software that includes DOS 5.0, *Windows*, *Microsoft Works for Windows*, and America Online as well as a collection of software demos.

The system ships with 2MB of RAM and can be expanded to 16MB. The 2500 comes with a single 3½-inch floppy drive and an 85MB hard drive.

Expansion possibilities are somewhat limited: There's only one free drive bay and three 16-bit slots. However, video is on the motherboard, so you won't use one of the slots to drive your monitor. Video support goes to 1024 by 768 in 16 colors, although you'll need to increase the video RAM to access higher resolutions—a simple process. The system includes one parallel and one serial port, plus a built-in mouse port and a mouse.

The 2500 SX/25PC includes audio capabilities, but it's not compatible with *Windows 3.1* Multimedia Extensions. The internal speaker is small and tinny, but there's an audio output jack to drive an external speaker or headphones. The system also has a microphone input jack.

If you're concerned about being stranded without support, use the Open Window Hotline that connects every Radio Shack outlet to a Tandy technical team. The system has a one-year warranty.

You can save $300 by not ordering the hard drive, or opt for a system with additional video memory and a faster 120MB drive for $400 more.

—John Walkenbach

IN BRIEF

2500 SX/25PC

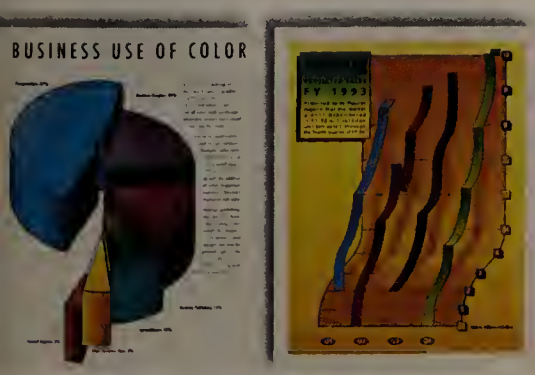
This 386SX runs at 25 MHz, and its low price makes it a good choice for a home system.

Tandy Corp./Radio Shack
Contact a local Radio Shack store or dealer
Reader service no. 694

Tandy's 2500 SX/25PC comes with lots of preinstalled software, but the $1299 price doesn't include a monitor.

The new HP PaintJet XL300 lets you make a splash without getting soaked.

At last. A printer with fantastic color and a brilliantly low price. $3,495.



Vivid color has never been so affordable. Hewlett-Packard introduces the PaintJet XL300 inkjet printer. Now you can add a 300 dpi color printer to your system for the remarkably low price of just $3,495.*

The PaintJet XL300 has HP LaserJet printer compatibility built right in. The same typefaces. The same page formatting. It also has PC/Macintosh auto-switching, so users in a mixed environment can share. And, just like a LaserJet, the PaintJet XL300 becomes network-ready with optional HP JetDirect interface cards.

Get laser-quality text and graphics on a choice of media that includes plain paper and transparencies. Or add optional Adobe® PostScript® for access to even more graphics applications.

Now that there's a printer as practical as the PaintJet XL300, maybe it's time you took the plunge into color. Call **1-800-752-0900, Ext. 3159** for a free print sample and the name of the authorized HP dealer nearest you.†

HEWLETT PACKARD

©1992 Hewlett-Packard Company *Suggested U.S. list price. Adobe and PostScript are registered trademarks of Adobe Systems, Inc. in the U.S. and other countries. †In Canada call 1-800-387-3867, Ext. 3159. PEI2204

Circle 114 on reader service card

A New Approach to Windows Data

Finally, a data management tool for Windows that's fully relational, handles a variety of file formats, and sports a great report writer.

With just a few exceptions, *Windows*-based data management tools have been disappointing. *Approach 1.0*, a new data manager from Approach Software, is one of those exceptions.

Approach is a personal, nonprogrammable data manager, fully relational and networkable, but not powerful or versatile enough for large-scale, multiuser, turnkey applications. It doesn't have a proprietary file format, but it handles *dBASE*, *Paradox*, and *Oracle* data (the *dBASE* DBF file is its default format), and it will even let you relate data from different file types. *Approach* adds memo and picture field support to *Paradox* files, something that Borland has yet to do.

With the Approach data base for Windows, you don't get just a graphic preview of a report, you get editable data within the graphic layout.

You can turn all these disparate data files into a relational and graphically pleasing data base by creating forms and reports.

In these reports, you define what can go into fields, set up calculated fields, and build relationships in a simple, point-and-click, intuitive dialog box. You can save a collection of forms, reports, macros, and data files in a single view (moreover, a data file can go into any number of views).

You can search for data through a simple query-by-form technique: You enter search criteria into a screen identical to the form or report in which it will appear. While this method is simple to grasp, it's more limiting than a full-fledged query by example.

Approach's report writer is where power and simplicity really merge. When you first create a report, you select your fields from the various open data files, and a deceptively simple report layout appears. Here you can easily move the fields around; create calculated fields; add bands for headers, footers, subtotals, and so on; and do just about everything that you are able to do in the best band-oriented report writer. But now you don't have to understand complicated band-oriented report writers in order to do it. And when you look at data in a report, the data is *live;* you can edit it as if it were in a form.

At $399, *Approach* is at the high end of personal data managers. But the program proves that *Windows*, with a little imagination, can be a great environment for easy data management.

—*Lincoln Spector*

IN BRIEF

Approach 1.0

WINDOWS This personal (but networkable) data manager makes relational work in Windows an easy and intuitive job.

Approach Software Corp.
311 Penobscot Dr.
Redwood City, CA 94063
415/306-7890,
415/368-5182 (fax)
Reader service no. 697

Microsoft C/C++ 7.0: A Feature-Rich Compiler

At long last, Microsoft has officially shipped its C++ compiler for DOS and *Windows—C/C++ 7.0*. Offering far better code generation than the antiquated *Microsoft C 6.0*, it supports *C++ 2.1* and features the *Microsoft Foundation Class Libraries*, an application framework for *Windows*. The compiler is 32-bit only and requires at least a 386 (though it can generate code for older processors). Other features include p-code (packed code or pseudo-code), which runs slowly but sometimes saves space, and precompiled headers.

The *C/C++ 7.0* package features a raft of bundled utilities and tools, including a free copy of Qualitas's *386Max* memory manager (necessary to run the compiler under DOS); a new *CodeView for Windows* (with remote debugging and new technology licensed from Nu-Mega, makers of *Soft-ICE* and *Soft-ICE for Windows*); the *Microsoft Windows* Debug Kernel; *Spy* (an application that monitors *Windows* message traffic); and the *Windows 3.1* Multimedia Extensions. Also included in the package are MOVE, an improved overlay manager, and a new version of the *Programmer's Workbench* development environment. Unfortunately, this environment is character based; *Windows* programmers will have to run it in a DOS session even when they're developing *Windows* code.

The package weighs over 20 pounds and has 12 manuals. It's $139 for users of other C or C++ compilers for DOS. Full price is $499. —*Brett Glass*

IN BRIEF

C/C++ 7.0

WINDOWS Microsoft's long-awaited compiler for DOS and Windows has much-improved code generation.

Microsoft Corp.
One Microsoft Way
Redmond, WA 98052
800/426-9400
Reader service no. 698

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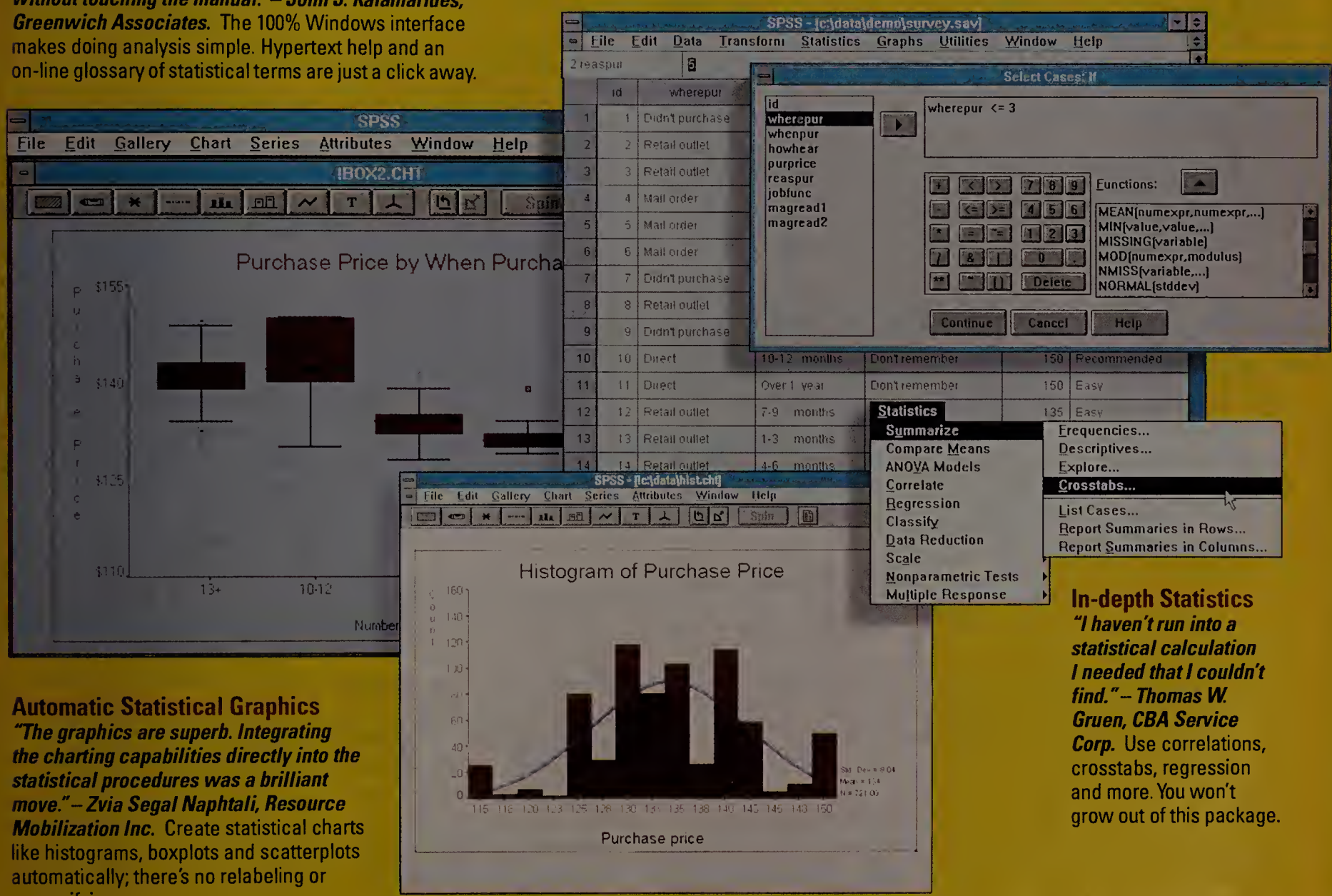

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Spinnaker's Painless Publisher for Windows

PFS:Publisher puts on a Windows interface, with movable dialog boxes, WinWord-like command buttons, and 12 scalable fonts.

If God had wanted you to become a desktop publisher, She'd have given you a Mac. Life is too short to waste time mastering the intricacies of *PageMaker* or *Ventura Publisher.* For an easy way to create professional-looking documents on a PC, you need a program like Spinnaker's *PFS: Publisher for Windows 1.0.*

Spinnaker's $149 desktop publishing package has joined the ranks of low-cost *Windows* packages like *Microsoft Publisher* and *Express Publisher for Windows,* offering a host of WYSIWYG tools that take the pain out of page design.

Like most page layout programs, *PFS* lets you create boxlike frames on each page and pour text or graphics into them. If you're short on time or design talent, you can select one of *Publisher*'s 50 preset templates. You can even assign icons (called Quick Buttons) to as many as 24 pulldown menu commands, making operations such as printing or saving to disk a one-click affair.

Unlike most low-end packages, *PFS* doesn't come up short on long documents. You can set up master pages containing rules, logos, and other elements that repeat on every page of your document. Its paragraph style sheets make it easy to make global style changes. And the program automatically generates an index and table of contents.

Publisher accepts text in a variety of popular formats and comes with a built-in word processor, a thesaurus, and a spelling checker. You also get Atech's *Publisher's Powerpak,* featuring 12 scalable font outlines, and support for *Windows 3.1*'s TrueType fonts. But if you want to add Adobe Type 1 fonts, you'll need *Adobe Type Manager.*

PFS also comes to the aid of the artless, providing more than 100 pieces of clip art. You can view thumbnails of each, as well as other PCX, TIFF, and BMP clip art. You can wrap text around irregular graphics, rotate images in 45-degree increments, and use snap-to guides to align objects.

PFS is not the complete low-end desktop publisher. It lacks a pasteboard for storing text and graphics, and if you pour in more text than a frame can hold, you'll have to create a new frame to handle the overflow. You can't import high-quality EPS images or create fancy type effects like text along a curve. But despite its shortcomings, it's a worthy contender for the low-cost–layout crown.

PFS:Publisher for Windows requires 2MB of RAM and *Windows 3.0* or *3.1.* Upgrades from the DOS version are $79. —*Daniel Tynan*

IN BRIEF

PFS:Publisher for Windows 1.0

WINDOWS PFS's host of templates and style controls makes creating professional-looking documents a no-pain, no-brain affair.

Spinnaker Software Corp.
201 Broadway
Cambridge, MA 02139
617/494-1200,
617/494-1219 (fax)
Reader service no. 699

Push-Button Art

Desktop publishers looking to enhance scanned photos and bit-mapped images in dramatic, highly artistic ways have two new assistants—*Classic Art* for *Windows* and *Fractal Design Painter 1.2 for Windows.*

Classic Art, from Aldus subsidiary Silicon Beach, is essentially a library of 16 artistic effects—charcoal, spatter, emboss, watercolor, and so on—that you can apply to all or part of an image. The resulting TIFF, BMP, or TGA file, altered to look like, say, a pen-and-ink copy of the original, is also readable on the Mac version. These images offer an easy way to dress up a presentation or document. The $199 *Classic Art,* which can get by with a standard VGA card (a 16-bit or 24-bit card is recommended), runs as a stand-alone application or as an add-in to *Aldus PhotoStyler 1.1* and *Fractal Design Painter.*

Fractal Design Painter takes the do-it-yourself art concept even further. Along with chalk, water, fade (an incremental undo), and dozens of variations, *Painter* includes a van Gogh and Seurat tool, which applies brushstrokes emulating those artists' styles to your image. Billed as a "natural media" paint program, *Design Painter* simulates textures—such as oil paints on canvas or charcoal on paper—with stunning accuracy when used with a 24-bit graphics board (it requires at least 256-color super VGA). This $399 package works with a mouse, which is how most desktop publishers will use it. But artists who hook it up to a pressure-sensitive graphics tablet, as recommended, will be able to create spectacular illustrations from scratch.

—*Steve Fox*

IN BRIEF

Aldus Gallery Effects: Volume 1, Classic Art

WINDOWS This package gives you a simple way to apply sophisticated artistic effects to scanned or bit-mapped images.

Silicon Beach Software, Inc.
411 First Ave. S
Seattle, WA 98104
206/628-2320,
619/695-6956
Reader service no. 700

Fractal Design Painter 1.2 for Windows

WINDOWS As close to a paintbrush and easel as the PC gets.

Fractal Design Corp.
335 Spreckels Dr., Ste. F
Aptos, CA 95003
408/688-8800,
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FrameMaker 3.0 for Windows: Look Out, Ventura

FrameMaker is the leading application in high-end, workstation-based publishing, where networked users produce truckloads of documents—books, catalogs, manuals, and technical publications. With *FrameMaker for Windows*, Frame Technology brings its well-integrated writing, design, and production tools to the PC-based office publishing market.

Because *FrameMaker*'s forte is industrial-strength technical publishing, it isn't intended for producing brochures, newsletters, or other short, design-intensive documents. Instead, *FrameMaker*'s cross hairs are trained on long-document design king *Ventura*.

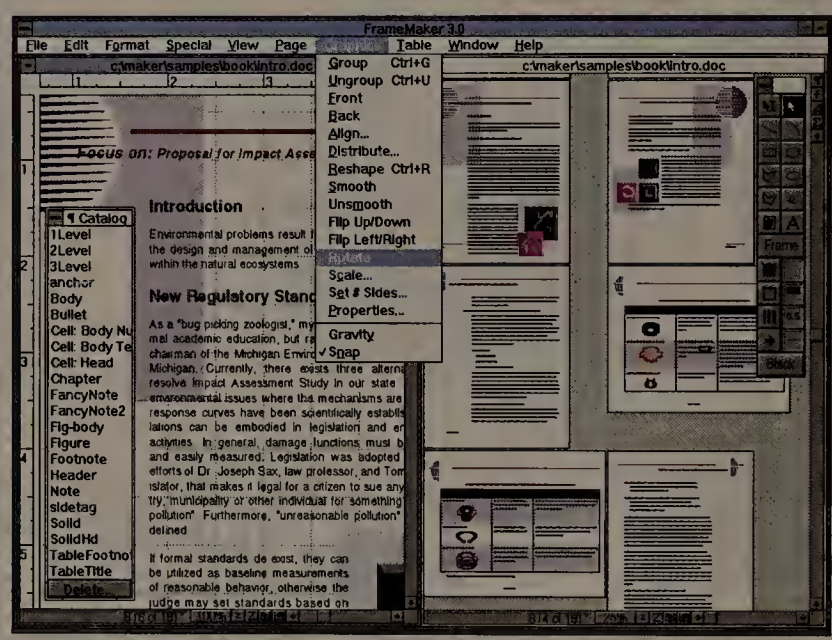
FrameMaker lets you place a slew of imported text and graphics in frames and format a document by applying predesigned templates and style tags. It excels at producing lengthy multichapter publications that require versatile headers and footers, footnotes, cross-references, tables, equation typesetting, and anchored or floating graphics (frames that automatically move with linked text). *FrameMaker* provides automatic numbering, indexing, and tables of contents; supports live links to embedded data (via *Windows* OLE); and includes a handy spelling checker and search-and-replace tools. It ships with *Adobe Type Manager*.

Many of *FrameMaker*'s long-document features are a cut above *Ventura*'s. For example, both products let you insert variable text in a document (such as a parts catalog), which makes it easier to produce different versions—such as those based on regions or demographics—from the same file or document. However, *FrameMaker* effectively lists all variable text in a single dialog box so you can easily reference text changes in each edition of a document. Auto-numbering, cross-referencing, and equation editing are also more flexible. And if you want to create multiple master pages, a reference page (for storing text and graphics), and hypertext links (to establish branches between different parts of a document), *FrameMaker* is your only choice.

FrameMaker's bag of tricks includes the capability to open and edit multiple documents, mix portrait and landscape pages in the same document, scroll through a document vertically or horizontally, and zoom in 1 percent increments (from 25 to 1600 percent). It also offers powerful graphic drawing features, such as Bézier curve–based tools.

On the downside, *FrameMaker* lacks automatic text wrap, so you must redefine text columns to make them fit. Placing large capital letters at the start of a paragraph is a time-consuming manual operation, and spot color is limited to eight fixed colors.

With this release, *FrameMaker* now offers more cross-platform compatibility than any other publishing package—networked users can work on the same *FrameMaker* documents on a Mac, PC, NeXT, or UNIX-based machine. —*Richard Jantz*



FrameMaker 3.0 for Windows can open multiple documents in separate windows and lets you choose a customizable zoom.

IN BRIEF

FrameMaker 3.0 for Windows

WINDOWS A powerful Windows publishing package for creating and revising structured technical documents.

Frame Technology Corp.
1010 Rincon Cir.
San Jose, CA 95131
800/843-7263,
408/433-1928 (fax)
Reader service no. 702

WordPerfect's One-Stop Shop

Integrated packages are the convenience stores of software—compact, quick, and basic. Among the newest is *WordPerfect Works*, combining the *LetterPerfect* word processor with a graphics editor, a data base, a communications application, and spreadsheet capabilities.

The word processor, a slim version of *WordPerfect 5.1*, includes a graphics editor, spelling checker, thesaurus, and mail merge and macro capabilities. It's compatible with *WordPerfect 5.1*.

With the spreadsheet, you can create and edit charts and graphs and import or export *1-2-3* files. You can set up hotkey links to *1-2-3*, hit the <Plus> key if you want a quick summary, or tighten up your titles with a kerning tool. A flat-file data base manager lets you set up as many as 80 fields. You can use the built-in note card, address book, or inventory data bases, or you can create your own.

The communications program transfers files, downloads from a BBS, and communicates with on-line services. If you want to send a fax, just create the file in *LetterPerfect* and send it from your system.

WordPerfect Works 1.0's straightforward interface includes pulldown menus and context-sensitive help, and a Run menu lets you execute any application from the one you're in. At a low price of $159 and a memory requirement of 400K, this handy little package is a good solution for the small office or the mobile manager.

—*Bronwyn Fryer*

IN BRIEF

WordPerfect Works 1.0

This integrated package combines the LetterPerfect word processor with a graphics editor, data base, communications program, and spreadsheet.

WordPerfect Corp.
1555 N. Technology Way
Orem, Utah 84057
800/451-5151,
801/222-5077 (fax)
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InfoWorld 9-30-91

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Publish Magazine June 1992. *(Suggested retail prices.)*

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February/March 1992

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June 1992

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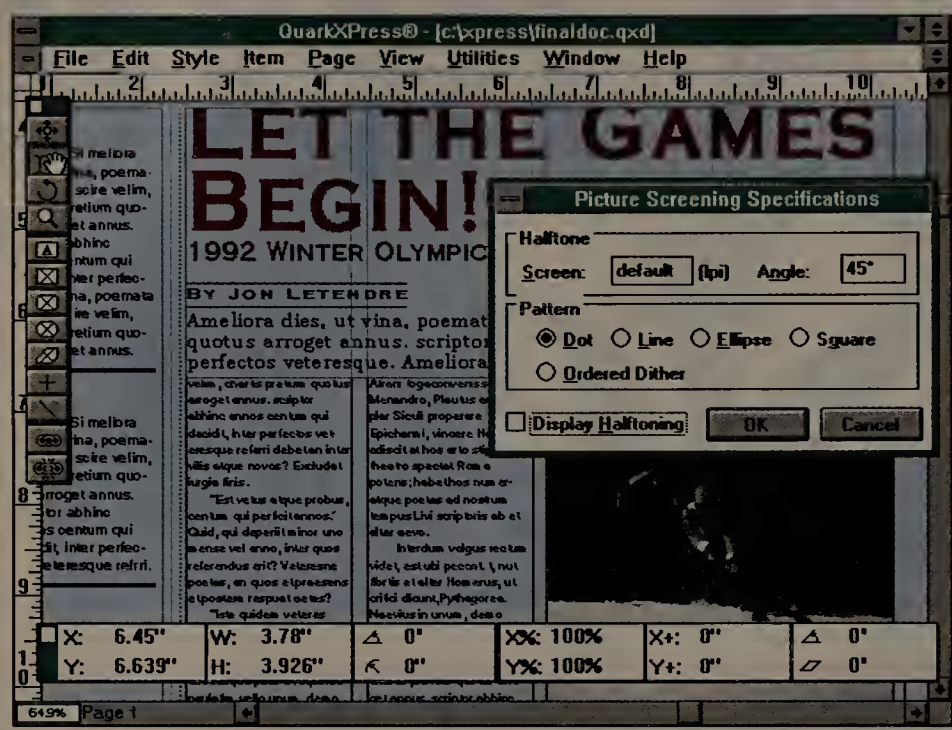
Circle 183 on reader service card

QuarkXPress Comes to Windows, but Bring a 486



In addition to its excellent typographic capabilities, QuarkXPress lets you adjust halftone settings for a gray-scale bit map and arrange the placement of page elements numerically.

Macintosh desktop publishing darling *QuarkXPress* is migrating to *Windows.* Equipped with precise numerical positioning, text rotation, and printing capabilities found in no other PC-based DTP application, the $895 *XPress* is aimed at newsletter and brochure designers who now swear by *PageMaker.*

There's one critical drawback to the program: It requires a 486 to perform anything more than simple text editing. But if you have the power, *XPress* offers all the capabilities you'll need to combine type and graphics on a printed page.

Hard-core design professionals will find *XPress*'s page building precision appealing. Unlike *PageMaker, XPress* allows you to link and unlink columns of text at will. To ensure the proper placement of these columns, a measurements window displays the exact coordinate location of any selected text or graphic frame box, accurate to a thousandth of a point. Alignment is also a strong suit; the program has flawless control over columns and text within tables.

When it comes to sophisticated text editing functions, *XPress* outshines even dedicated text wranglers like *WordPerfect* and *Microsoft Word.* You can use *XPress* as a word processor or import text from most common formats. You'll be able to check the spelling of a document or search and replace characters without swapping view modes. To top it off, *XPress* is the only DTP program that lets you rotate one or more lines of text in 1-degree increments.

When it's time to print, *XPress* doesn't miss a trick. The program provides full support for Pantone, Focoltone, and Trumatch color printing standards. Regardless of the color model you select, you can blend colors to create gradations. If your document includes a gray-scale bit map, you can adjust the screen angle of the halftone dots, the screen frequency (the number of dots per inch), and the dot shape. To make sure that colors from different separations will align correctly when they are commercially printed, you can instruct *XPress* to automatically expand the size of bordering page elements to create color traps.

XPress lets you run text around graphics, create master page items that display on every page of a document, format text using modifiable style sheets, and scale, crop, and adjust the contrast of imported graphics. About the only thing missing from *XPress* is the capability to automatically generate tables and indexes.

—Deke McClelland

IN BRIEF

QuarkXPress 3.1

WINDOWS The first choice among Macintosh design professionals threatens PageMaker's grip on the short-document DTP market.

Quark, Inc.
1800 Grant St.
Denver, CO 80203
800/788-7835,
303/894-8888
Reader service no. 704

A Windows File Transfer Utility

If you hate trying to combine data from incompatible programs and formats, it may be time to look outside. Systems Compatibility Corporation's *Outside In for Windows 1.0* is a file viewing and data import utility that makes it easier to find, view, and import files while you're running *Windows.*

Outside In for Windows 1.0 combines the best of the *Windows* Clipboard with *Norton Desktop*–like utilities. You can search across directories, drives, and networks to track down a file from more than 90 word processing, data base, or spreadsheet files in DOS, *Windows,* or Macintosh file formats.

When you find the file you're after, you can view it in its original format or print it out—even if you don't have the application installed on your system.

You can select all of a file or just part of it and then paste your selection into another application, including a DOS program. The format of the original document will be retained. If you want to launch the file's associated application from the viewer, all you have to do is click a button.

Outside In for Windows can be installed as part of the *Windows* File Manager, *Norton Desktop for Windows, Word for Windows, Ami Pro,* or *WordPerfect for Windows.*

Priced at an easy-to-swallow $89, this handy utility may be just the ticket for those who want to have access to all their files at any time.

—Bronwyn Fryer

IN BRIEF

Outside In for Windows 1.0

WINDOWS This file viewing and transfer utility makes it easy to combine data from different programs and formats.

Systems Compatibility Corp.
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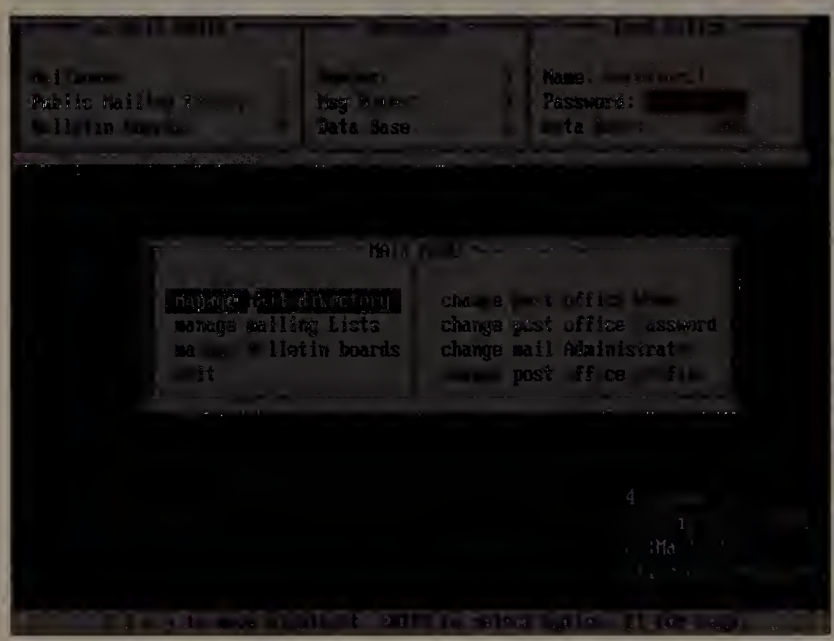
Better E-Mail for DOS Users

The market leader is easier to use, with new attachment features, including the ability to associate files with their DOS applications.



In addition to a spelling checker and a host of other new features, cc:Mail MS-DOS Platform Pack has a colorful new interface.

If you haven't made the move to *Windows* and you use *cc:Mail MS-DOS Platform Pack* as your office E-mail program, you'll love the collection of new features that Lotus has packed into *cc:Mail MS-DOS Platform Pack 4.0.*

Most impressive is the program's improved TSR capability. Version 4.0 includes a TSR that occupies only about 15K of RAM and lets you hot key directly into *cc:Mail* from any DOS application. *3.2* offered several TSR modes, but its most advanced mode used a whopping 94K of RAM and lacked many of *4.0*'s features.

While no DOS program can offer the kind of application integration that makes *Windows* so appealing, *cc:Mail MS-DOS Platform Pack 4.0* makes it easier for you to view, edit, or create file attachments. You can configure *cc:Mail* to load a DOS program associated with the file extension of an attachment. For example, choose to view an incoming file attachment with the extension DOC, and your word processor will pop up with the file loaded.

Also useful is the draft folder feature that lets you save an E-mail message before sending it. Say you're writing a lengthy business proposal to the Big Boss and want to double-check some spreadsheet figures. Version 4.0 lets you save the message as a draft document and revise it later. In previous versions, you were stuck sending the unfinished message to yourself.

Ever erased a message accidentally? *4.0* has a trash folder that lets you undelete messages you mistakenly zap. Also, a new full-text search function helps you find messages buried in your in-box.

Version 4.0 includes a word processing necessity that should be standard issue in all E-mail packages: a spelling checker. Just hit a hot key to search for misspellings and double words. Also convenient are configurable text editor keys that let you use many of the same key commands as you do with your word processor.

Other nice touches: text-only PostScript printer support for higher-quality output, 180-degree fax rotation to correct upside-down incoming faxes, and a choice of color patterns for the user interface.

Network administrators will appreciate the host of tools designed to simplify the maintenance of *cc:Mail.* Novell net supervisors can now kick users off *cc:Mail* without shutting down the LAN, and the program's directory supports up to 490,000 users.

cc:Mail MS-DOS Platform Pack 4.0 costs $195 for the server pack, and upgrades are $95. Packs for 8 and 25 users and site licenses are available.

—Jeff Bertolucci

IN BRIEF

cc:Mail MS-DOS Platform Pack 4.0

This upgrade of the popular E-mail program offers better text editing, a spelling checker, and many other features.

cc:Mail, Inc., a division of Lotus
2141 Landings Dr.
Mountain View, CA 94043
800/448-2500,
415/961-8800
Reader service no. 706

Let Customers Phone for Faxes

If you're a small-business owner or sales manager looking for an easy and inexpensive way to fax sales and product information to customers, *RoboFax EZ* from Add-On America may be the solution.

Users can call a *RoboFax EZ*–equipped PC from a fax-connected touch-tone telephone, listen to the recorded voice greeting, and then choose a document by punching in the correct number. *RoboFax EZ* immediately faxes the document to the caller.

The $1295 product consists of two AT bus add-in boards (one for 9600-baud fax and the other for voice messages), software, an external speaker, cables, and telephone jacks. A menu-driven installation program guides you through setup, and a software log keeps track of the number of callers and which documents were requested. The fax board is Group III compatible and can automatically adjust itself to transmit faxes at either 7200, 4800, or 2400 baud.

Add-On America also sells the $2995 *RoboFax Pro* for larger businesses. This fax-on-demand product can handle up to four fax transmissions simultaneously, and unlike the *EZ* version, will call the customer back to send the fax. (Small businesses may like the fact that *RoboFax EZ* doesn't make any callbacks, which saves on long-distance phone expenses.) *RoboFax EZ* is particularly useful to firms with overseas clients. International customers can request faxes at all hours—and you don't have to pay for the call.

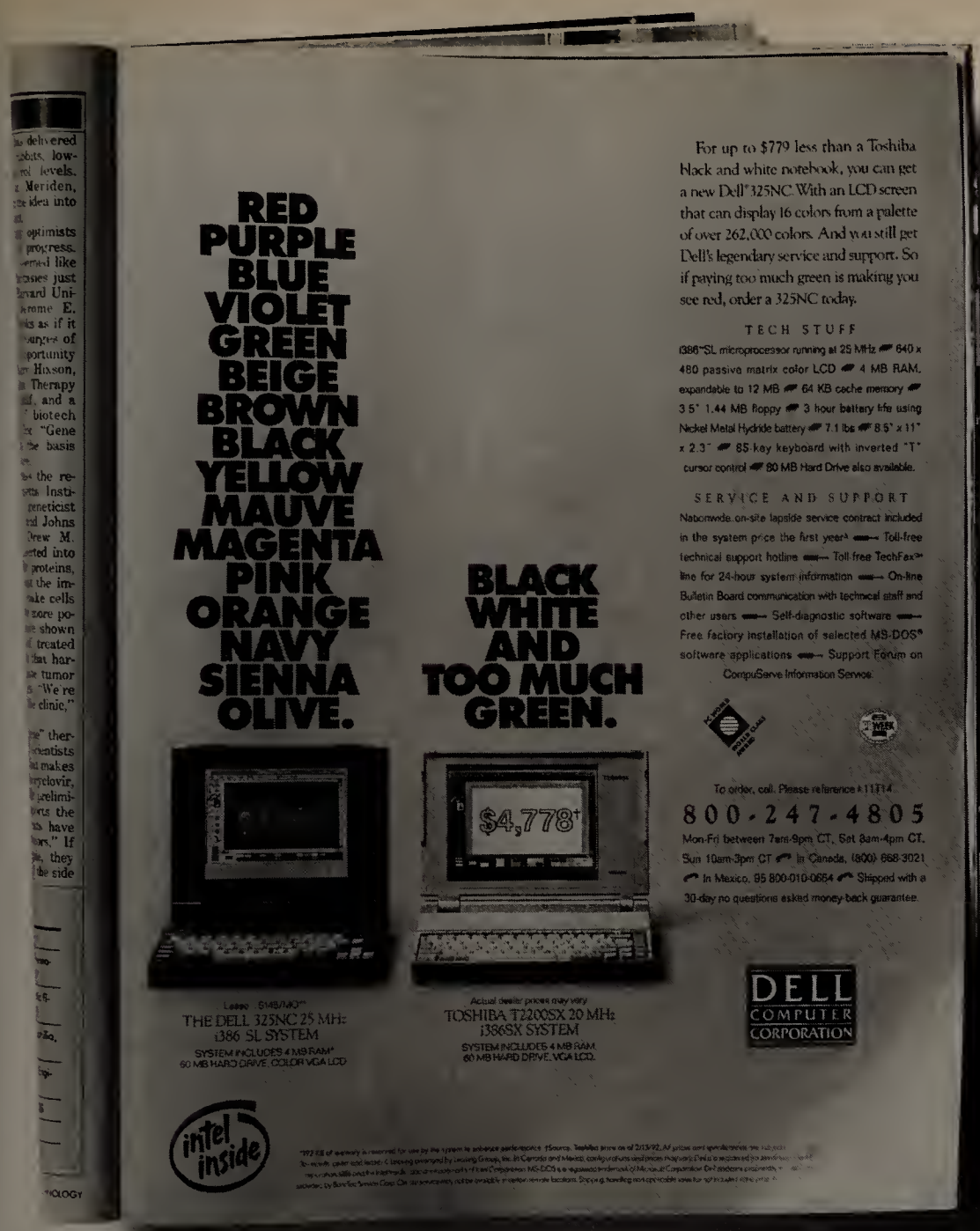
—Jeff Bertolucci

IN BRIEF

RoboFax EZ

This PC-based, fax-on-demand product automatically sends out fax documents to callers.

Add-On America, a division of Rohm Corp.
433 N. Mathilda Ave.
Sunnyvale, CA 94086-4222
800/292-7771,
800/925-7626
Reader service no. 707



IT LOOKS LIKE YELLOW JOURNALISM TO US.

If Dell Computer paid $4,778 for a Toshiba T2200SX, we'd like to suggest they never wander into a used car dealership.

Because at participating Intelligent Electronics dealers, the actual price of a Toshiba T2200SX is only $2,699. According to our math, that's $2,079* less than Dell claims it costs.

More importantly, that means the T2200SX is cheaper than the Dell 325NC. And even though

T2200SX with 4MB RAM, actual price.

Dell just lowered their price, Toshiba is still $600* cheaper.

Of course, that's not the only information they neglected to give you. For instance, the T2200SX is a pound and a half lighter and almost 30 percent smaller than Dell's computer. Toshiba offers standard key spacing versus Dell's squeezed keys. And Toshiba's award-winning T2200SX allows you expansion capabilities with a desktop docking station. Dell, naturally, doesn't.

As for Dell's so-called color screen, consider that it's a passive matrix LCD whereas Toshiba offers several computers in its line that feature brilliant 256-color TFT active matrix screens.

And those are the facts, in plain black and white.

Intelligent Electronics

To purchase a Toshiba computer call us at 1-800-423-1715 and we'll direct you to your nearest participating dealer.

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*We don't want to mislead you. Since 5/1/92, Dell has lowered the price of the 325NC/60 from $3999 to $3299, and Toshiba has lowered the suggested retail price of the T2200SX/80 (with standard 2MB RAM) from $3499 to $3099. Funny how our price still beats Dell's. 102501

Circle 135 on reader service card

Full LAN Access via Modem

UDS Motorola's LanFast modem combines a high-speed, 14,400-baud modem and an Ethernet LAN adapter.

Dial-in modems like UDS Motorola's new LanFast and Shiva's NetModem/E give you full access to the office LAN while you're on the road. Each product packs a high-speed, 14,400-baud modem and an Ethernet LAN adapter in one modem-size box.

Both products come with communications software for dial-in/dial-out access. You can modem in from a hotel room and grab a spreadsheet or document off a Novell NetWare LAN, query a data base, or use the office printer or fax machine. Plus both products can work as shared modems on a network, saving you the expense of buying a separate modem for each node.

LanFast, the newer of the two products, features an additional serial port that allows for simultaneous dial-in/dial-out access. This feature can come in handy on LANs where several users have access to LanFast. Considering the product's $1995 price, it may initially find greater acceptance as a shared network modem than as a dial-in node.

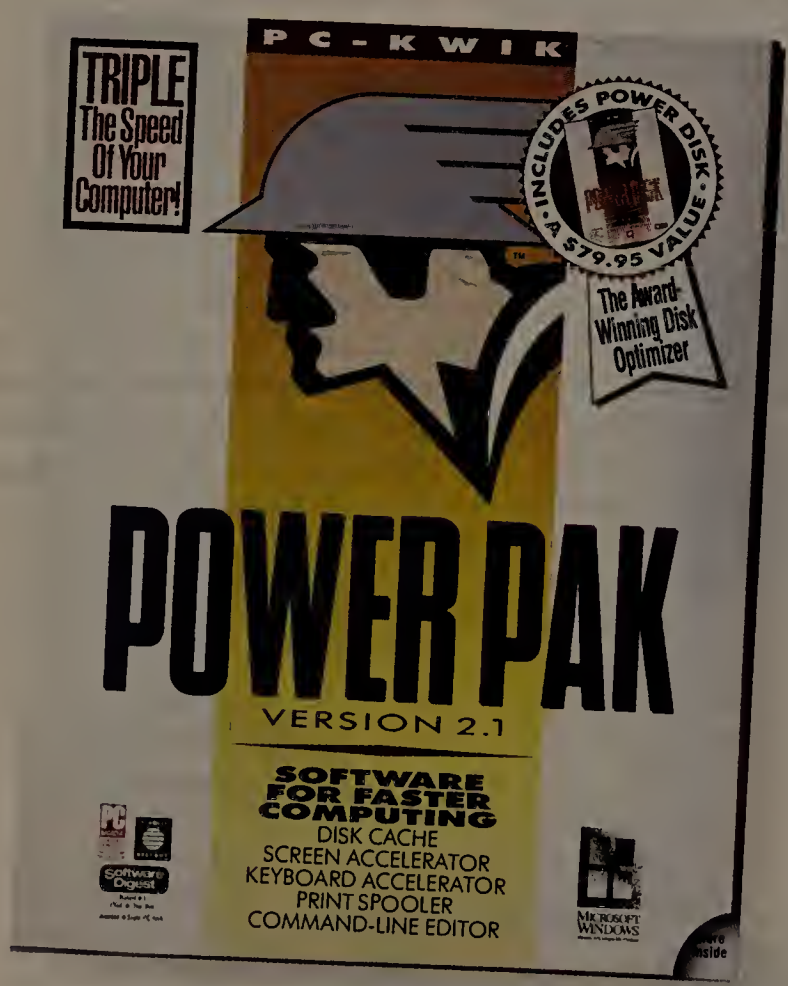
Meanwhile, Shiva has introduced a software upgrade, release 1.1, for its NetModem/E that improves the product's performance and reliability by giving remote users greater control over the dial-in connection. They can change the connection speed and enable or disable the error correction and data compression features to boost throughput.

To keep LAN operations smooth, release 1.1 includes LaunchGuard, a 3K TSR that cautions remote users against loading programs over the phone link. Release 1.1 is free to all NetModem/E users and requires no hardware adjustments. NetModem/E costs $1699. —*Jeff Bertolucci*

IN BRIEF

LanFast
A modem for simultaneous dial-in/dial-out.
UDS Motorola
5000 Bradford Dr.,
Huntsville, AL 35805
800/451-2369,
205/430-8000,
205/430-8208 (fax)
Reader service no. 708

NetModem/E 1.1
Software upgrade provides control over connections.
Shiva Corp.
One Cambridge Center
Cambridge, MA 02142
800/458-3550,
617/252-6300
Reader service no. 709



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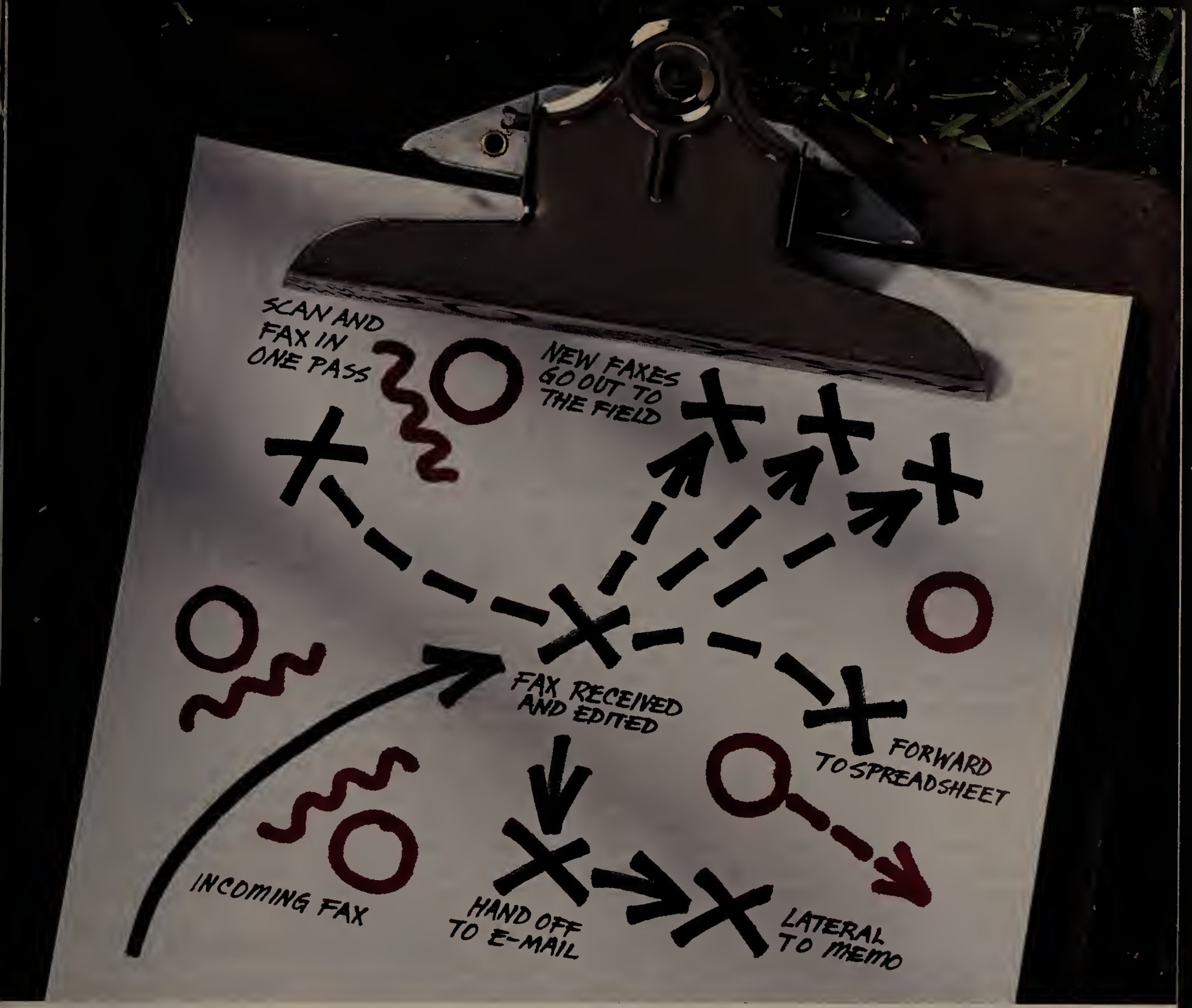
PCW7

Circle 19 on reader service card



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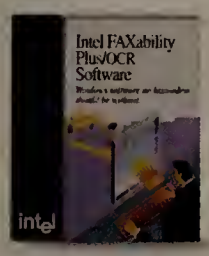

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Circle 109 on reader service card

ProKey for Windows 1.1

WINDOWS If you want more flexibility in your *Windows* macros than Recorder offers, you've probably considered RoseSoft's *ProKey for Windows*, a utility that enables you to assign macros to any keystroke in any *Windows* application. With *ProKey for Windows 1.1*, a number of features have been added. First of all, you're now able to launch programs, with command-line parameters, from a *ProKey* macro and set up other programs to launch *ProKey* macros. When you enter an extended ASCII character via an <Alt>-*numpad* sequence while recording a macro, *ProKey 1.1* will return that character when you play the macro back. There's a new one-finger mode for typing shifted keystrokes—a big advantage for disabled users—and debugging has been improved. *ProKey for Windows 1.1* lists for $99. Upgrades from *ProKey for DOS* and *ProKey for Windows 1.0* cost $29.95. RoseSoft, Inc., P.O. Box 70337, Bellevue, WA 98007; 206/562-0225, 206/562-9846 (fax).

Reader service no. 710

AST Bravo 4/33

Even in a world of cutthroat PC pricing, AST Research is determined to offer the best price-performance deal in town with its new Bravo 4/33. A fully configured 4/33 costs $2995 and includes a 33-MHz 486 microprocessor; 2MB of RAM (expandable to 16MB on the motherboard); an 80MB hard drive; a 3½-inch floppy drive; a super-VGA controller with 1024 by 768 resolution and support for up to 256 colors; a super-VGA color monitor; drivers for *Windows 3.1, WordPerfect,* and *AutoCAD;* four drive bays; a keyboard; preinstalled DOS 5.0 and *Windows 3.1;* and a mouse and mouse pad. AST Research Inc., 16215 Alton Pkwy., Irvine, CA 92713; 800/876-4278, 714/727-4141 (fax).

Reader service no. 711

Intel 387 SL Math Coprocessor

Intel's new math chip for SL-based notebooks gives you extra number-crunching power for the road. The 387 SL makes it possible to run computation-intensive applications such as spreadsheets, computer-aided design, and graphics on portable PCs without reducing battery life, according to Intel. The 387 SL supports the 386 SL's "stop clock" mode, where the CPU turns off the math chip when it's not needed. When executing an instruction, the 387 SL uses 30 percent less battery power than the 387 SX, Intel claims, and shifts to idle mode when not executing an instruction. The new math chip works with any Intel 386 SL or SX CPU (16 to 25 MHz). The 387 SL costs $189. Intel Corp., 2200 Mission College Blvd., P.O. Box 58119, Santa Clara, CA 95052-8119; 408/765-4483.

Reader service no. 713

Futurus Lite Mail 1.0

An entry-level version of the *Futurus Team for DOS* E-mail package, *Futurus Lite Mail* offers simple, low-cost E-mail for peer-to-peer LANs running Novell's *NetWare Lite. Futurus Lite Mail* offers a good collection of E-mail essentials: TSR capability that uses 6K of RAM; hot-key access to E-mail; on-line help; keyword search; reply, forward, and archive functions; the capability to rotate, print, and "zoom" into faxes; and even a real-time chat mode for two-way, on-line conversations. You increase the number of allowable E-mail users by installing a new copy of *Futurus Lite Mail* on a LAN node. A 5-user pack lists for $199.95; additional users are $39.95. Futurus Corp., 211 Perimeter Center Pkwy. #910, Atlanta, GA 30346; 404/392-7979, 404/392-9313 (fax).

Reader service no. 714

With its 486/33 CPU and high-performance video drivers, the AST Bravo 4/33 has enough horsepower to run as a network server or as a stand-alone graphics workstation.

HP LaserJet PostScript Cartridge Plus

Owners of Hewlett-Packard's LaserJet III, IIID, and IIIP printers can now reap the benefits of Adobe PostScript Level 2. HP's $695 cartridge offers better memory management, forms caching, and bit-map compression to speed printing of often sluggish PostScript files. This intelligent cartridge reads incoming print jobs and then switches automatically between PostScript and the HP III line's native PCL 5 language—a boon for networked users. But you'll need at least 2MB of printer RAM (4MB for the IIID). Meanwhile, the Adobe PostScript Level 1 cartridge will still be available at a reduced price of $495. Hewlett-Packard, 19310 Pruneridge Ave., Cupertino, CA 95014; 800/752-0900, 208/344-4809 (fax).

Reader service no. 715

Grammatik 5

WINDOWS *Grammatik 5,* now available for both DOS and *Windows,* locates redundancies in your paragraphs and checks to see if the word you've chosen fits its context. You can customize the program to understand your company or department style. The new on-line help not only guides you through the software's features, but it also explains grammatical errors. And the program is extremely versatile: With the *Windows* version, you can check documents produced in any *Windows* application. *Grammatik 5* retails at $99; you can upgrade for $34.99 or trade in a competitive package for $44.95. Reference Software Int'l, 300 Townsend St., San Francisco, CA 94107; 800/872-9933, 415/541-0509 (fax).

Reader service no. 717

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RightWriter 5.0

Que Software's *RightWriter 5.0 for DOS* includes all the features of the new *Windows* version, with customizable writing styles and an interactive editing mode that checks errors as you write. You can mark a location in your document and return to that place when you reopen it, or use a mark-up mode to insert comments directly into your word processing files. *RightWriter 5.0 for DOS* is available for $99.95, and an upgrade costs $29.95. This completely rewritten version of the popular grammar checker comes with new customization options. Que Software, 11711 N. College Ave., Carmel, IN 46032; 800/992-0244, 317/573-2655 (fax).

Reader service no. 718

HP Vectra 386s/20

With the new 20-MHz HP Vectra 386s/20 386SX, you're protected from the outside in, starting with a case that locks securely but releases with the turn of a key and the push of two tabs. And the Vectra features a security program in ROM, including separate passwords for the user and a LAN administrator and the capability to lock the keyboard, bar floppy writes, and disable the serial port. You also get ergonomic touches like hardware screen blanking that lets your programs continue to run and a low-emissions Swedish MPR II–standard monitor. On top of that, you get two dual-speed fans that adjust automatically to temperature. You can access the motherboard in minutes, remove it with a single screw, and upgrade with a 486 EISA system board. Everything is wrapped up in one case that serves as either a tower or a desktop. The Vectra 386s/20 with a 120MB hard disk and 2MB of RAM (expandable to 16MB) lists for $2249. Hewlett-Packard, 19310 Pruneridge Ave., Cupertino, CA 95014; 800/752-0900.

Reader service no. 720

BetterYet IV

Pondering whether to dump your old LaserJet II in favor of a LaserJet III or PostScript printer? Output Technology has a way to squeeze more performance out of LaserJets. OTC's $999 BetterYet IV is a board/cartridge combo that promises fast PCL 5 and PostScript emulations and enhanced resolution. The RISC-based accelerator board plugs into the optional I/O port on a LaserJet II, IID, III, or IIID; a cartridge containing PostScript and PCL fonts slips into the left front slot. BetterYet IV switches automatically between its PCL 5 and PostScript emulations and doubles output resolution to 600 by 300 dpi. (High-resolution PostScript requires another 1MB of printer RAM.) Output Technology Corp., 2310 N. Fancher Rd., Spokane, WA 99212-1381; 800/238-7938, 800/468-8788.

Reader service no. 721

Ares FontMonger 1.0

WINDOWS In a perfect world there would be one font standard instead of a dozen. Fortunately, programs like *Ares FontMonger* make an imperfect world a little easier to manage. This $150 *Windows*-based utility lets you convert fonts between a host of formats—Adobe Type 1 and Type 3, Nimbus Q, Agfa Intellifont, TrueType, and others—and retain font hinting for the highest-quality type. You can even save fonts in Macintosh and NeXT formats. *FontMonger* lets you modify existing fonts and save them in any of the supported formats and

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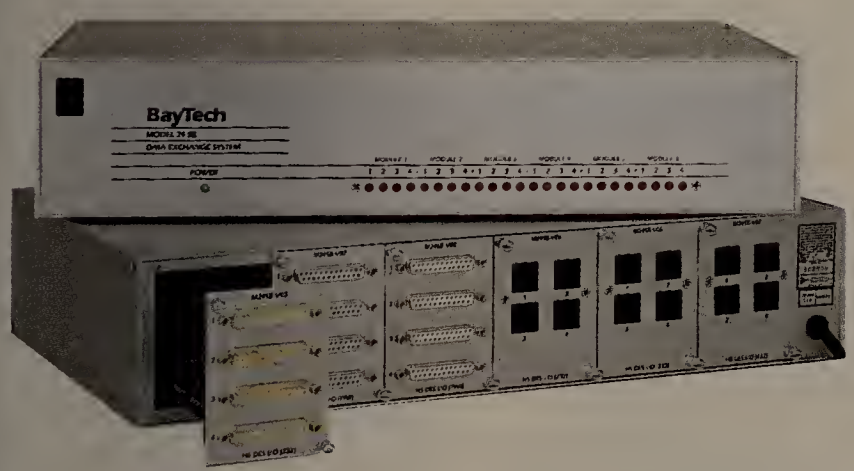
		HP IIISi	HP III	HP II
PC Parallel Output	0:40	:14	:27	1:10
Parallel Output via Tran•x LPT-460 Parallel Extender at 460k baud	0:52	:14	:27	1:10
PC Serial Output at 115.2k baud	3:26	:52	:52	1:10

These results were obtained in lab tests using BayTech F-Print and with LS-1C installed in the HPIII. Speeds will vary depending upon the application program being used.
*Time between pages in multiple page print jobs, first page print time may be slightly longer.



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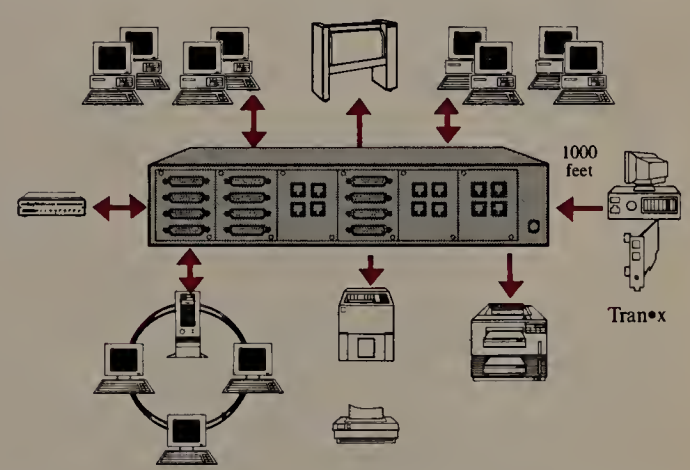

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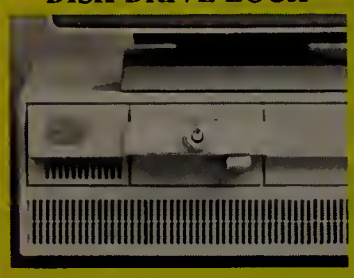

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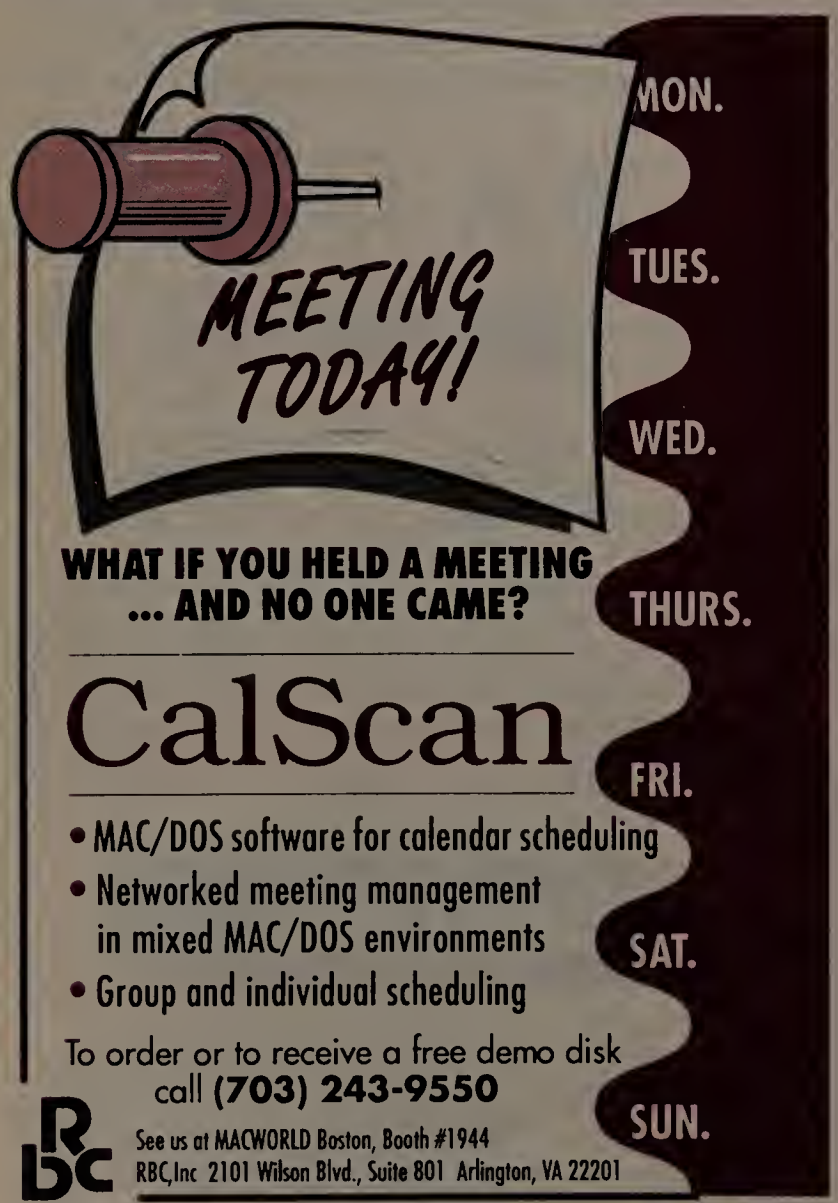
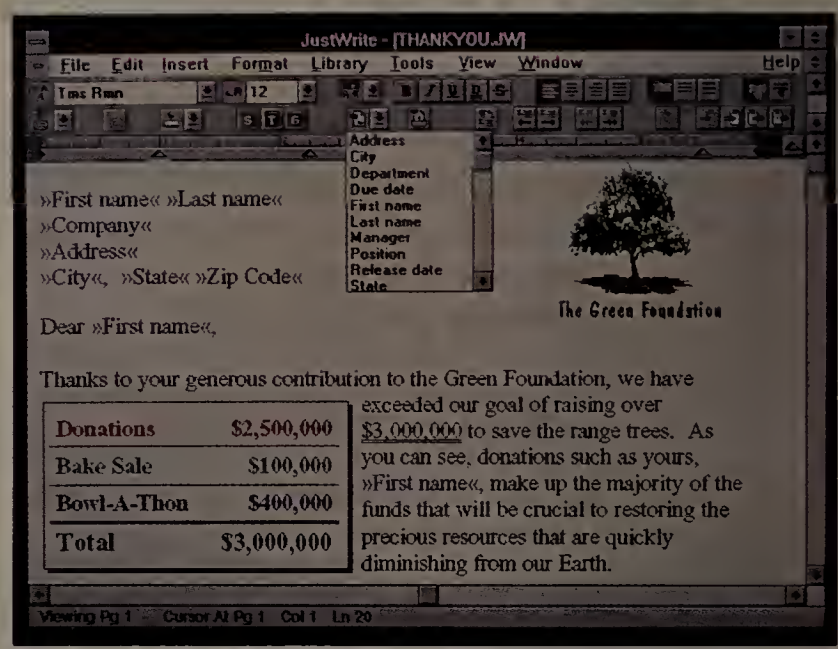


Circle 226 on reader service card



JustWrite 2.0 lets you place graphics, text, table, and OLE frames anywhere and assign functions to the customizable icon bar.

remap your keyboard to access special characters such as fractions or foreign currency symbols. Ares Software Corp., 561 Pilgrim Dr., Ste. D, Foster City, CA 94404; 415/578-9090, 415/378-8999 (fax).

Reader service no. 722

Software Bridge 5.1

There are some substantial improvements to the *Software Bridge* file conversion program in this release. The upgrade converts files from over 60 word processing, data base, and spreadsheet programs into any of 30 word processing formats, including *WordPerfect for Windows* and both versions of *Word for Windows*. The files retain the formatting of the original document, including tabs, margins, and fonts. An improved text searching capability lets you search entire directories for specific text from the program's viewing window, and you can select multiple documents for conversion. *Software Bridge 5.1* costs $149; the upgrade from version 5.0 is $29.95, or $39.95 from earlier versions. Systems Compatibility Corp., 401 N. Wabash #600, Chicago, IL 60611; 800/333-1395, 312/670-0820 (fax).

Reader service no. 723

JustWrite 2.0

WINDOWS Symantec's quick-and-dirty *Windows* word processor has been tuned up to make it even quicker, but not dirtier. The upgrade includes a host of new capabilities. You can place graphics, text, table, and OLE frames anywhere on the page or even spanning multiple columns. If you don't want to turn to your spreadsheet for math calculations, the integrated table editor will help you. You can place icons for frequently used functions—such as cut, paste, and print—along a customizable tool bar or use the new grammar checker to clean up your prose. The program lets you merge data from *Q&A*, *dBASE*, *Paradox*, or ASCII data bases and display mail merge documents on the screen before you print. *JustWrite* supports DDE and OLE links. At $249, *JustWrite 2.0* packs a lot of word processor into a low-price package; upgrades are $49. Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 800/441-7234, 408/252-4694 (fax).

Reader service no. 724

For more information about any product, contact the manufacturer or circle the number on the reader service card.

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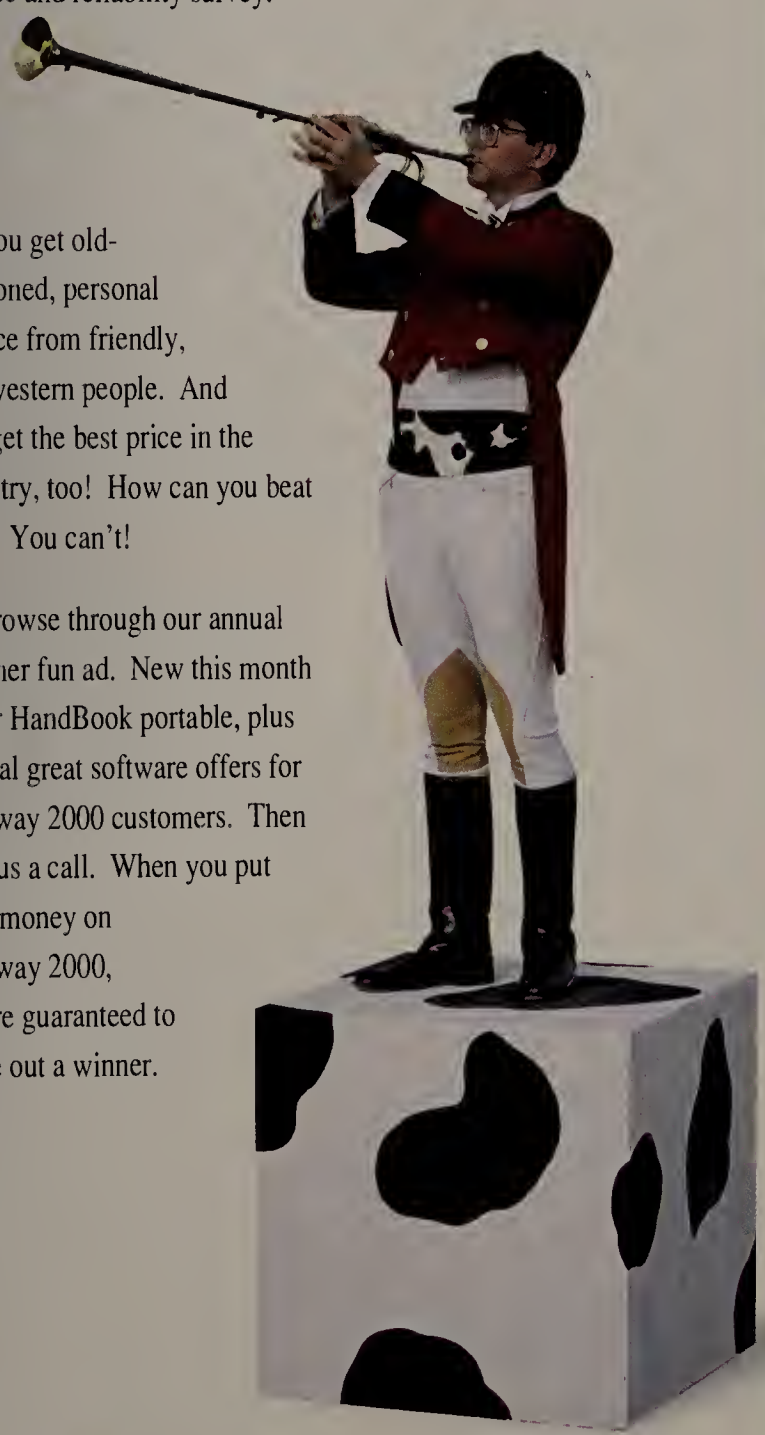
The Choice Is
Black & White!
ATOKAD PARK

The results are final — all those thoroughbred "favorites" outdistanced by a simple, determined, black-and-white cow.

There's a big payoff for you if you picked Gateway 2000. You get a quality, high-performance system with the number-one customer satisfaction and reliability ratings in the industry, according to *PC Magazine* readers in the 1992 service and reliability survey.



You get old-fashioned, personal service from friendly, Midwestern people. And you get the best price in the industry, too! How can you beat that? You can't!

Browse through our annual summer fun ad. New this month is our HandBook portable, plus several great software offers for Gateway 2000 customers. Then give us a call. When you put your money on Gateway 2000, you're guaranteed to come out a winner.

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PORTABLES

486 SYSTEMS

SERVICE

OPTIONS

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That Puts You In T

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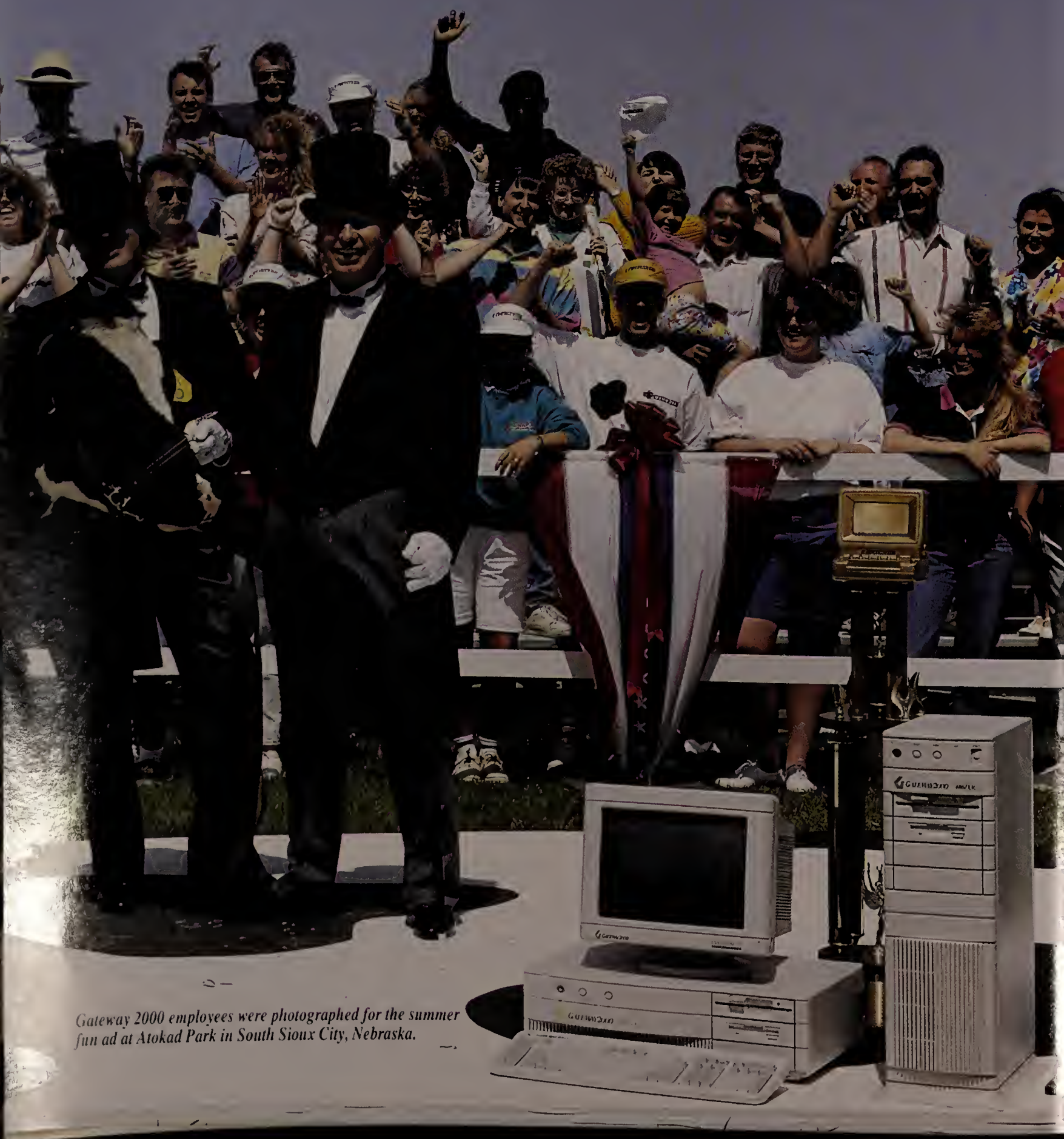
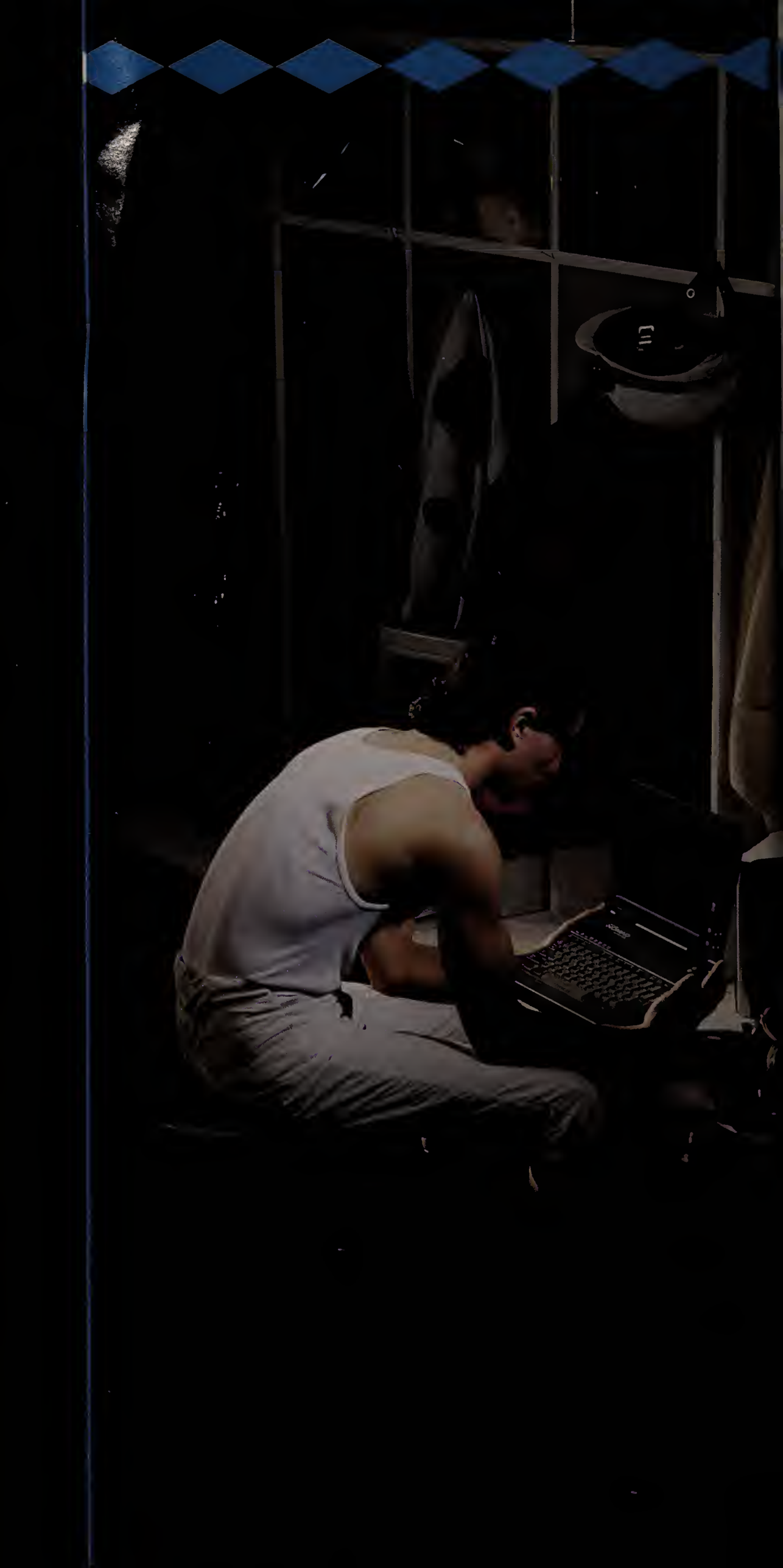


Gateway 2000 employees were photographed for the summer fun ad at Atokad Park in South Sioux City, Nebraska.



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The Nomad Series

Our small, lightweight Nomad notebook computers let you take desktop computer performance anywhere you go. Nomad models come with VGA graphics, a FieldMouse™ (portable pointing device), built-in floppy drive, and an 80 or 120MB hard drive, depending on the model. A patented power-management system gives you hard-to-beat battery life benchmarks — over six hours of operation from a single battery on the 25MHz 486DX system!

The Nomads have a bright, crisp, backlit, 10-inch triple supertwist VGA screen — resolution is 640 x 480, 64 gray scale, on the LCD. With simultaneous video, you can also display on an external monitor.

All these features ... and the Nomads are made in the U.S.A.!

Nomad 325SXL $1995

25MHz, 386SXL processor ■ 2MB RAM ■ 80MB hard drive

Nomad 420SXL ■ $2795

20MHz, Intel® 486SXLP processor ■ 4MB RAM ■ 80MB hard drive

Nomad 425DXL ■ $3495

25MHz, Intel 486DXLP processor ■ 4MB RAM ■ 120MB hard drive

For The Power User On The Go

Nomad Combo ■ $3995

Since the Nomad 425DXL has all the power of a 486DX desktop system, it's the ideal portable/desktop combination system! Save with this combo package!

Combo Highlights: Nomad 425DXL ■ 15" CrystalScan 1572FS color monitor ■ programmable 124-key AnyKey™ keyboard

The HandBook™

If you like to travel light, you can't go wrong with the HandBook. It weighs only 2.75 pounds and measures roughly 6 x 9 inches — smaller than this magazine! Yet it has 286-class performance and real PC features including a bright, backlit screen, a bonafide 40MB hard drive and a comfortable keyboard (no chiclet keys). Downloading information from your HandBook to your office computer is easy with the serial cable and file transfer software provided.

HandBook ■ $1295

For The Executive On The Go

HandBook Combo ■ $3995

Combine the portability of our HandBook with the power of our 33MHz 486 desktop system with communication capabilities — and you have a terrific combo, Gateway value-priced!

Combo Highlights: HandBook with 2,400 bps external modem and communication software ■ 33MHz 486DX system with 120MB IDE hard drive ■ TelePath™ fax/modem package

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Gain The Winning Edge With 486 Performance

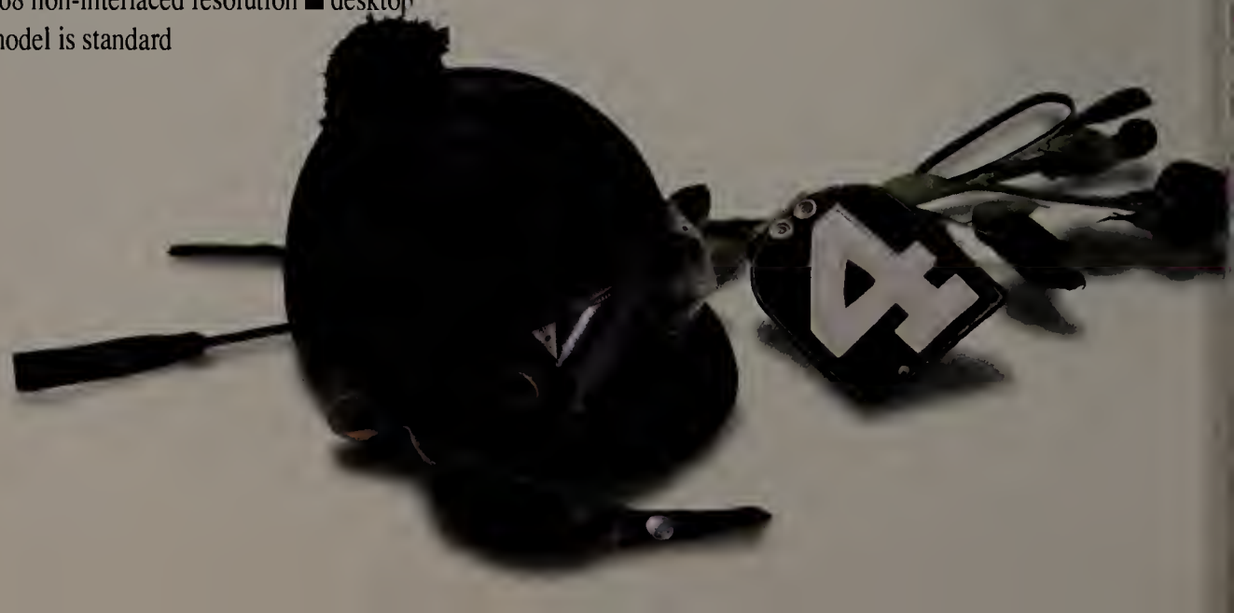
Gateway's powerful 486 models give you the winning margin! And when you recap our recent price reductions and compare feature-for-feature against the other runners, you'll find you won't even have to play your hunches — Gateway 2000 is the odds-on favorite.

25MHz 486SX ■ $1995

At $1,995, our 486SX/25 is the hottest value on the market. With this sy you get 486 technology, including internal cache and burst mode, at price. And besides being faster th 386 on the market, the 486SX/25 upgradeable to 50MHz if you nee increased performance in the futu ***System Highlights:*** 4MB RAM ■ Western Digital IDE hard drive ■ ATI™ Graphics Ultra ■ 14" CrystalScan 1024NI VGA color monitor, up to 1024 x 768 non-interlaced resolution ■ desktop model is standard

33MHz 486DX ■ $2495

We recently increased performance and lowered the pric of our best-selling, award-winnin 486DX/33 by adding an ATI Gra video card with a graphics coprocessor. At $2,495, the price/performance ratio on this machine is hard to beat. Plus, it's an upgradeable PC. You'll be able to switch to 66MHz later this year. ***System Highlights:*** 64K cache RAM ■ 4MB RAM ■ 200MB Western Digital IDE hard drive ■ ATI Graphics Ultra ■ 14" CrystalScan 1024NI VGA color monitor, up to 1024 x 768 non-interlaced resolution ■ desktop model is standard



50MHz 486DX2 ■ $2795

Gateway 2000's new 486DX2/50 systems, ISA and EISA, incorporate Intel's speed doubler technology. The internal core of the DX2 processor executes at 50MHz while communicating with the external memory bus at 25MHz. Our benchmarks show a 35% increase in performance over a 33MHz 486DX PC.

The high-performance ATI card is standard on the 486DX2/50 as well, plus this system incorporates our new RIDE technology for faster disk operations. RIDE stands for Rapid Integrated Drive Electronics. RIDE technology takes advantage of our new system BIOS that allows the drive to transfer bigger data blocks at one time. Our Coretest benchmarks show large block disk-to-memory operations are over 30% faster with RIDE. For example, you'll notice the increased performance whenever you type WIN at the system prompt, or when you double-click on an icon in Windows. It's much faster. Our product marketing director claims the 486DX2/50 with the ATI video card and RIDE is the fastest personal computer he's ever used!

System Highlights: 64K cache RAM ■ 8MB RAM ■ 200MB Western Digital IDE hard drive with RIDE BIOS ■ ATI Graphics Ultra ■ 14" CrystalScan 1024NI VGA color monitor, up to 1024 x 768 non-interlaced resolution ■ desktop model is standard

EISA SYSTEMS

Our product line includes two EISA systems — a 33MHz 486DX and a 50MHz 486DX2. Both EISA systems now come standard in a floor-standing tower model, and include large, fast SCSI drives and EISA SCSI controllers. RAM cache is expandable to 256K. The 486DX/33 EISA will be upgradeable to 66MHz later this year.

System Highlights: 128K cache RAM ■ 8MB RAM ■ 340 MB Maxtor® SCSI hard drive ■ 32-bit EISA SCSI controller ■ 16-bit Diamond Speedstar Plus SVGA graphics with 1 MB ■ 14" CrystalScan 1024NI VGA color monitor, up to 1024 x 768 non-interlaced resolution ■ floor-standing tower model is standard

486DX/33 EISA ■ $3795 (Upgradeable to 66MHz later this year.)
486DX2/50 EISA ■ $3895

Gateway 2000 systems come fully configured with all the performance features you want, including two floppy drives, a programmable 124-key AnyKey keyboard, a Microsoft®mouse, MS DOS® 5.0, Windows,™ 3.1 and your choice of one application software option. See the back pages of this ad for complete configurations and information about software options, upgrades and peripherals.

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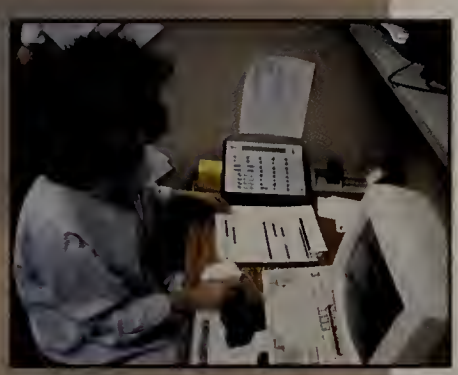

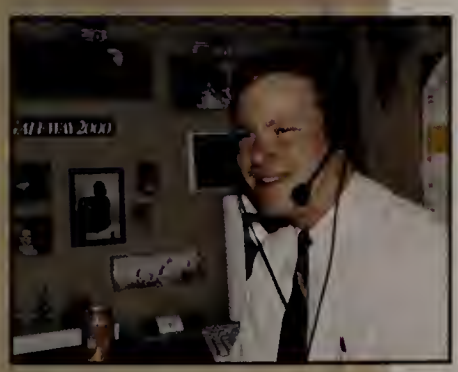

The Gateway Team Is Behind You All The Way

There's a full team of dedicated service professionals standing behind your Gateway 2000 system. In fact, a recent *PC Magazine* reader survey proved Gateway the clear winner in service and reliability. We whizzed past all the contenders when PC owners were asked, "How likely would you be to buy the same brand system again?" The survey also rated Gateway Number-One in overall system reliability, and we were in the Top Five for tech support and repair service.

Whenever you call our sales number, you get a friendly, human voice — a helpful representative to provide you with information. In our customer support department, we have over 200 people on-line to supply free technical support for the life of your machine. They're experienced, rigorously trained and tested and ever patient, friendly and helpful. You'll see why we say "you've got a friend in the business" at Gateway 2000.

In our company mission statement, one of our stated objectives is to exceed customer expectations in quality, service and value. This objective is a personal challenge to each of us at Gateway. We know how important service is to you, which is why we're constantly striving to provide the best in the business.

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SERVICE

Gateway 2000 Adds A Bonus Payoff

Choose Your Software Option

With the purchase of any Gateway 2000 computer system, you receive your choice of one application software option at no additional cost. We'll install your software on your hard drive, optimally configured for your system and Windows, and provide master diskettes and manuals. You may also purchase a second application software option, pre-installed, at extremely competitive prices.

Installation and setup errors are responsible for over one-third of all software problems. You can eliminate that possible source of problems by purchasing your system from Gateway with software pre-installed, tested, and ready to run the moment your system arrives. Add that advantage to the hard-to-beat prices, and Gateway is the only logical choice for PCs and software!

Choose one of the following application software options:

Option #1-*Microsoft Excel for Windows™ 4.0*

■ New version of this powerful spreadsheet, includes online help for *Lotus 1-2-3®* users

Option #2-*Microsoft Word for Windows™ 2.0*

■ Best-selling word processor for Windows. New version 2.0 adds online help for *WordPerfect®* users

Option #3-*Microsoft PowerPoint for Windows™2.0*

■ Easy-to-use desktop presentations program creates high-quality overheads and 35mm slides

Option #4-*Borland® Paradox 3.5*

■ The award-winning database from Borland

Option #5-*The Entrepreneur Pack*

■ Includes the latest Windows versions of *Microsoft Works*™, integrating word processing, spreadsheet, and database in one easy-to-use program; *Microsoft Publisher*,™ for creating page layouts; *Microsoft Money*,™ to help you write checks, set budgets, track expenses; PLUS an *Entertainment Pack* with eight games, including *Tetris®*

Option #6-*The Windows Programmer Pack*

■ Includes everything you need to create programs for Windows: *Microsoft QuickC for Windows*™, *Windows Control Development Kit*™, *Windows Help Compiler*™ and *Windows Programmers' Online Reference*™.

Option #7-*Microsoft Project for Windows™3.0*

■ Flexible and easy project management program

NOTE: If you would rather replace an above option with *Microsoft Office*™, it is available for $175. This package includes *Word for Windows*, *Excel* and *PowerPoint*.

New! Second Applications At Great Prices!

The following applications are only available with the purchase of a system, pre-installed, or to Gateway customers.

Central Point® Anti-Virus 1.2 For Windows

Central Point Anti-Virus provides the most comprehensive virus protection for both corporate and single-user environments. Easy to use and transparent, its automatic operation provides total virus protection and advanced protection against unknown stealth viruses. ■ $75

Central Point Backup™ 7.2 for Windows

This is the first reliable, easy-to-operate backup program to offer full-featured DOS and Windows applications in one package ■ $75

The Norton Desktop™ 2.0 and Prisma Your Way 2.0 For Windows

Norton Desktop is a complete file management and utilities program for Windows. It visually integrates file and group management with an extensive collection of Peter Norton's best utilities. YourWay is a personal time and contact management system for Windows from Prisma, including card file, task manager, report, calendar and call management functions. ■ $95

These offers include the identical applications contained in retail packages but will not include the retail box. You get all master diskettes and manuals, shrink-wrapped and packaged in a Gateway 2000 box.

Central Point Commute

Whether you're running Windows or DOS, Commute lets you take remote control of your personal computer with complete security. Transfer files quickly between PCs using Commute's advanced continuous data compression system and reduce transmission time up to 50%. ■ $49

Peripherals

The Gateway 2000 Telepath™ Fax/Modem

The Gateway 2000 TelePath is a 14,400 bps modem, V .32bis, with 9,600 bps fax capability. The TelePath comes with WinFax Pro,™ Crosstalk™ for Windows, Qmodem™ and a free 30-day basic services CompuServe® membership — all for only $195!

■ Fax mode: V.17, V.29 and V.27ter

■ Data mode: V.32bis, V.32, V.22bis, V.22, V.21, Bell 212A and 103, V.42 and MNP 2-4 error correction, V.42 bis/MNP 5 data compression

The 15-Inch CrystalScan 1572FS

The 15-inch CrystalScan color monitor has a flat, square, non-glare screen to reduce distortion around the corners and provide edge-to-edge display area. The CrystalScan 1572FS is an upgrade option only with the purchase of a 386DX or 486 system for an additional $195. (Availability is limited.)

Sorry — we sell peripherals only with the purchase of a Gateway 2000 system, or to people who are already Gateway 2000 customers. For fastest service, call our new direct line for the ***Component Add-On Division: 800-252-3333.*** *Please have your customer ID handy when you call.*

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GATEWAY 2000 WINNERS CIRCLE

PORTABLES

HANDBOOK™

- 286 Class Performance
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- Size 5.9" x 9" x 1.4", 2.75 Lbs.
- 4-Hr.* NiMH Battery & Charger
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- 78-Key Keyboard
- DOS, File Transfer Software & Serial Download Cable
- Introductory Bonus Pack
- Carrying Case

$1295

NOMAD 325SXL

- 25MHz, 386SXL Processor
- 2MB RAM
- 1.44MB 3.5" Drive
- 80MB IDE Hard Drive
- Backlit 10" VGA Screen, 64 Grays
- Simultaneous Video with 256K
- Size 8.5" x 11" x 1.8", 5.8 Lbs.
- 7-Hr.* NiCad Battery & Charger
- 1 Parallel/1 Serial Port
- 79-Key Keyboard
- FieldMouse™ Pointing Device
- MS DOS® 5.0 & Windows™ 3.1

$1995

NOMAD 420SXL

- 20MHz, Intel® 486SXLP Processor
- 4MB RAM
- 1.44MB 3.5" Drive
- 80MB Hard Drive
- Backlit 10" VGA Screen, 64 Grays
- Simultaneous Video with 1MB
- Size 8.5" x 11" x 1.8", 5.8 Lbs.
- 6-Hr.* NiCad Battery & Charger
- 1 Parallel/1 Serial Port
- 79-Key Keyboard
- FieldMouse Pointing Device
- MS DOS 5.0 and Windows 3.1

$2795

NOMAD 425DXL

- 25MHz, Intel 486DXLP Processor
- 4MB RAM
- 1.44MB 3.5" Drive
- 120MB Hard Drive
- Backlit 10" VGA Screen, 64 Grays
- Simultaneous Video with 1MB
- Size 8.5" x 11" x 1.8", 5.8 Lbs.
- 6-Hr.* NiCad Battery & Charger
- 1 Parallel/1 Serial Port
- 79-Key Keyboard
- FieldMouse Pointing Device
- MS DOS 5.0 and Windows 3.1

$3495

DESKTOPS

25MHz 386SX

- Intel 386SX Processor
- 4MB RAM
- 1.2MB & 1.44MB Drives
- 80MB 17ms IDE Cache Drive
- 16-Bit SVGA with 512K
- 14" CrystalScan 1024 Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey™ Keyboard
- Microsoft® Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$1595

25MHz 486SX

- Intel 486SX Processor
- 4MB RAM
- 1.2MB & 1.44MB Drives
- 120MB 15ms IDE Cache Drive
- ATI™ Graphics Ultra Video
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$1995

33MHz 486DX

- Intel 486DX Processor
- 64K Cache RAM
- 4MB RAM
- 1.2MB & 1.44MB Drives
- 200MB 15ms IDE Cache Drive
- ATI Graphics Ultra Video
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

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50MHz 486DX2

- Intel 486DX2 Processor
- 64K Cache RAM
- 8MB RAM
- 1.2MB & 1.44MB Drives
- 200MB 15ms IDE* Cache Drive
- ATI Graphics Ultra Video
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
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- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

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**Enhanced IDE with RIDE (Rapid Integrated Drive Electronics)*

50MHz 486DX2 EISA

- Intel 486DX2 Processor
- 128K Cache RAM
- 8MB RAM
- 1.2MB & 1.44MB Drives
- 340MB 15ms SCSI Cache Drive
- 32-Bit EISA SCSI Controller
- 16-Bit SVGA with 1MB
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software
- Tower Model is Standard

$3895

OTHER SYSTEMS

- Other systems in our product line: 16MHz 386SX, 20MHz 386SX, 25MHz 386DX, 33MHz 386DX, 33MHz 486DX EISA. Call for details and pricing.

** Battery life was measured using PC Magazine's Battery Rundown Test with power management enabled. Actual results may vary depending on configuration and applications.*

All prices and configurations are subject to change without notice. Prices do not include shipping. Components, peripherals and software are sold only with the purchase of a system, or to customers who already own Gateway 2000 systems. Some limitations apply.

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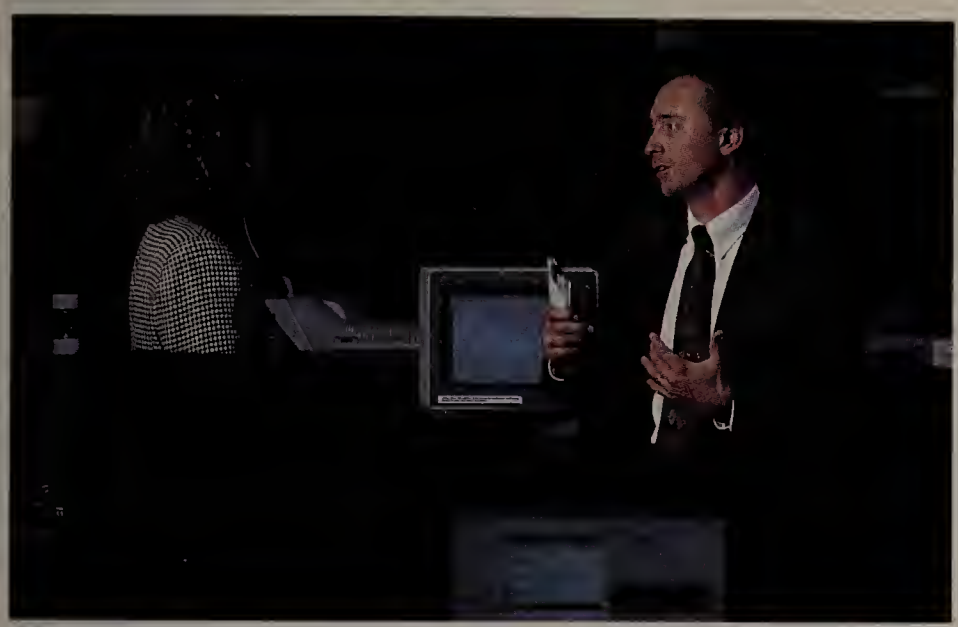
Edited by ERIC BENDER

OS/2 Praised, Windows Still Leads

Windows 3.1 Has More Applications, Greater Familiarity, Lesser Hardware Requirements. Can OS/2 Attract Enough Converts?



In a complex sales application at Southwestern Bell, OS/2's 32-bit architecture translated to "big differences in speed," says Matt Rakers.

JAMES VISSER

Back from the dead? Not quite, but OS/2 has made an unexpected comeback.

Early users of OS/2 2.0, IBM's next-generation system software, say it is far more capable and friendly than previous versions. Whether it's attractive enough to convince users to toss their copies of *Windows* remains to be seen. What is certain is that IBM's task is formidable. Winning converts—among both DOS and *Windows* users—in the face of Microsoft's *Windows* juggernaut requires more than technical prowess. It also calls for deft software marketing and an ability to enlist system vendors to ship PCs with OS/2—neither of which IBM has yet demonstrated in the PC arena.

When the first version shipped four years ago, OS/2's gargantuan size, lethargy, and lack of effective support for DOS applications made it an option only for large corporations that had stamina and in-house technical expertise. IBM slowly improved the system, but the market didn't wait. *Windows 3.0* has been a raging success since its debut two years ago, despite chronic crashes, performance limitations, and crippled network support.

OS/2 2.0 offers a completely revamped Macintosh-like interface; sophisticated and robust multitasking; the capability to run *Windows*, DOS, and upcoming 32-bit OS/2 applications; improved speed; and a large and varied assortment of desktop productivity tools (see "OS/2 2.0 Challenges Windows 3.1," June 1992). *Windows 3.1* delivers crash protection, a more integrated interface, an improved File Manager, upgraded network support, better performance, TrueType scalable fonts, Object Linking and Embedding (OLE) between programs, and even audio support.

The two products aren't really peers. *Windows 3.1* is built on top of DOS, it suffers all of DOS's inherent limitations, and it doesn't claim to match OS/2's more advanced capabilities such as true multitasking and support for the 32-bit architecture in 386 and 486 machines. An apples-to-apples comparison will have to wait for Microsoft's upcoming 32-bit operating system, Windows NT, which is scheduled to arrive sometime around year-end.

Windows: That Familiar Feeling

OS/2 2.0 and *Windows 3.1*'s graphical interfaces differ radically in style. OS/2's Workplace Shell takes a Macintosh-like approach to the desktop. Drag-and-drop is the main working metaphor, so you print or delete documents by moving their icons to a printer or trash can icon. Documents are loaded from the desktop just by clicking on the icons, and you store the documents in customized folders. "Initially it was difficult to get used to, but once you set up your workplace it's very intuitive," says Matt Rakers, information systems manager for Southwestern Bell Telephone in St. Louis.

The *Windows* interface, on the other hand, is merely competent but familiar to more users. Jim Canning, senior systems analyst for FMC Corporation in Santa Clara, California, claims the *Windows 3.1* interface is marginally improved, but "it's still awkward to have separate Program Manager and File Manager functions."

A bigger issue for *Windows* shops, however, is the training hurdle for users. "We've spent several years training people to use *Windows*, and we don't want to throw away that investment," says Brian Moura, assistant city manager in San Carlos, California.

OS/2 Gets Good Early Marks

Users grade the new system software

Windows 3.1	
Ease of installation	B+
Ease of networking	B
Ease of use	A-
File management	B-
Multitasking	B
Performance	A-

OS/2 2.0	
Ease of installation	B+
Ease of networking	A
Ease of use	A
File management	B+
Multitasking	A+
Performance	A-

PC World polled four early adopters of each new system software package and found that OS/2 advocates rated their system software higher than Windows devotees did. OS/2 posted better marks in ease of use, ease of networking, file management, and multitasking.

Calling for Fast PCs

OS/2 realistically calls for a fast 386 system with at least 6MB of memory and 15MB to 30MB of free hard disk space.

That doesn't go down easy even in hard-core Big Blue shops. "Probably 60 percent of our machines are PS/2 Model 55s with 2MB of memory and 60MB hard drives," says John O'Boyle, an analyst in office systems technology with jet engine manufacturer Pratt & Whitney in East Hartford, Connecticut. "I'm not sure we can afford to put $2000 to $3000 into each machine to make OS/2 run."

Of course, *Windows* isn't that far behind. While its disk storage needs are about half of OS/2's, it should have a 386SX with 4MB of memory.

Missing: OS/2 Applications

Windows holds a crucial lead in shrink-wrapped software. "There are thousands of applications currently available for *Windows*, but few that take advantage of the capabilities of OS/2 2.0," says Bill Cornfield, president of the Windows Support Group, a New York consulting firm. IBM claims that more than 1000 vendors are writing 32-bit OS/2 applications, but only development tools are available now. Thus OS/2 2.0's capability to run *Windows* packages is no small point.

Early indications are that *Windows 3.1*'s crash-protection features are much improved, but OS/2 still holds an edge. *Windows 3.0*'s instability often made it unsuitable for mission-critical applications. "We've got about 40 people running *Windows 3.0*, and when they call our help desk when it crashes, we just say, 'Sorry,'" says Bob Hitt, a programmer/analyst with the Missouri Highway and Transportation Department.

Advantage OS/2: The Fortune 500

Corporate managers say OS/2 is tailor-made for creating custom code, working on big networks, and establishing mainframe communications. At Southwestern Bell, for example, programmers are designing a complex sales application for 4000 users that exploits OS/2's 32-bit performance.

In large corporate environments, OS/2's capability to perform true preemptive multitasking and multithreading is important in certain roles—for example, it lets users start a communications session with a mainframe and then work on another task. Says Missouri's Hitt, "We don't have the time-out problems we had with *Windows 3.0*."

But those who want to download a file from a bulletin board in the background while typing a memo in the foreground will find *Windows 3.1*'s multitasking capabilities more than sufficient.

Windows 3.0 left plenty of network difficulties in its wake. Most of these have been cleaned up, but net managers remain wary.

On the other hand, some say OS/2's considerable installation and management demands are too much trouble.

Once you take the trouble to install OS/2 2.0, it offers distinct net advantages, says Gary Weis, senior vice president of networking and technology services for Sears Roebuck of Chicago. His company decided a year ago to convert more than 1000 workstations to OS/2 2.0, in part because it simplifies remote support. "Our technicians can support 1500 users without running around on site," says Weis.

Investment Inertia?

Many managers' buying plans turn not on which product is better but on how much money and effort they've invested in an existing setup. "All things being equal, I'd choose OS/2," says the Windows Support Group's Cornfield. "But the fact is, all things aren't equal." *Windows* has grabbed the hearts, minds, and pocketbooks of business users.

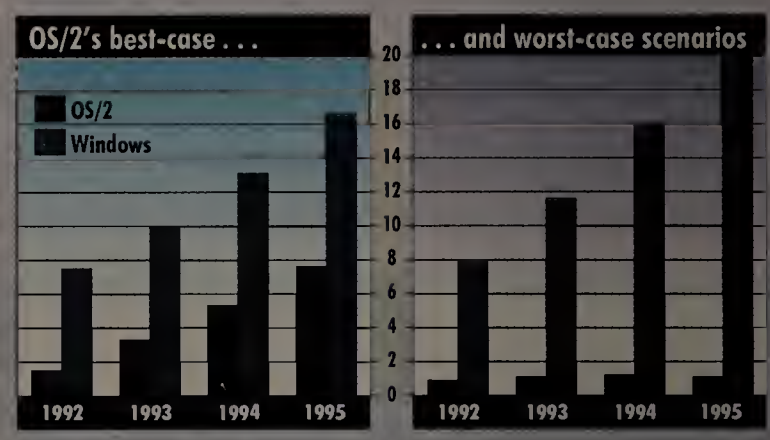
Moreover, for users already committed to *Windows*, Microsoft promises an easy migration path to Windows NT. OS/2 advocates say that in corporate environments brimming with technical expertise, OS/2 provides a solution today.

IBM will gain some converts simply by bundling OS/2 with selected systems, as it has already begun to do. And even some confirmed *Windows* fans will evaluate OS/2 for possible use. "OS/2 1.2 and 1.3 had so many problems that we didn't consider OS/2 a viable option," says Larry Shaw, PC coordinator for Nordstrom in Seattle, who oversees 500 *Windows* workstations. "But now it has some promise." IBM's challenge is to make that promise come true—and not just for the Fortune 500.

—Anita Amirrezvani

Windows Wins No Matter What

Estimates of system software shipped with new systems (in millions of units worldwide)



Source: The Gartner Group

It's early yet for both OS/2 2.0 and Windows 3.1—too early, market researchers say, for precise estimates of shipments. But Windows will dominate even if OS/2 prospers.

Users Sound Off on OS/2 and Windows

"We'd be dead in the water with OS/2 because it would take too much administrative work."

—Jim Canning
senior systems onolyst,
FMC Corporotion

"From a support person's standpoint, OS/2 is a dream come true. Now I can communicate with the AS400 while opening multiple applications on the Novell network—and really help the user."

—David Eller
systems analyst,
Sherrill Furniture

"I am very positively impressed with *Windows 3.1*—the ease of installation, WYSIWYG fonts, and higher level of reliability. But I still run into some of the same hardware memory conflicts as with *3.0*."

—Larry Shaw
PC coordinotor,
Nordstrom

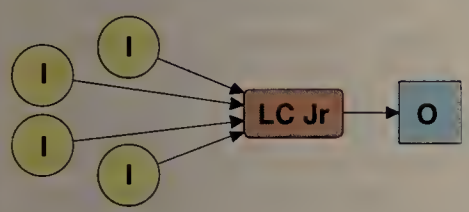
"If a stand-alone PC user is successfully using DOS today and simply wants to have multiple applications open on the desktop at one time, *Windows* is quite a valid environment. But if you move up to the LAN environment, OS/2 is worth it."

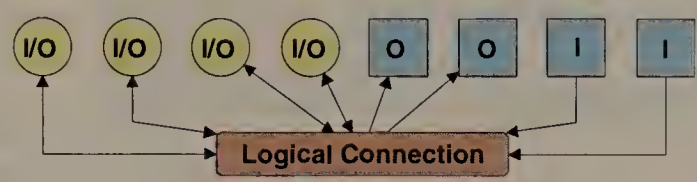
—Gary Weis
senior vice president of networking
ond technology services,
Seors Roebuck

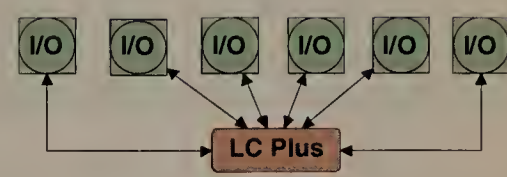
Both Windows and OS/2 have found enthusiastic backers—and detractors.

Printer Sharing

= PARALLEL DEVICE = SERIAL DEVICE = PARALLEL OR SERIAL DEVICE I = INPUT FROM PC O = OUTPUT TO PERIPHERAL

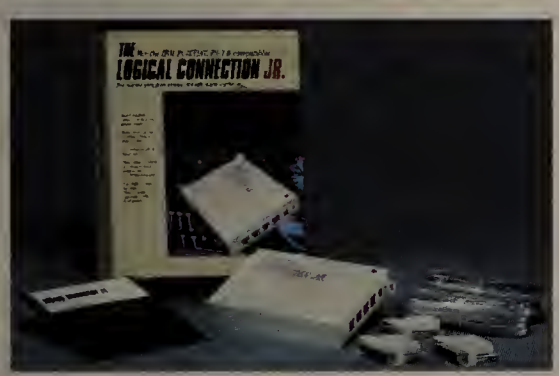






LC Jr.-256Kb $239

Serially connect up to four PCs to the **Logical Connection Jr.** at speeds up to 115,200 bps. It will automatically convert the data for easy sharing of one parallel printer.

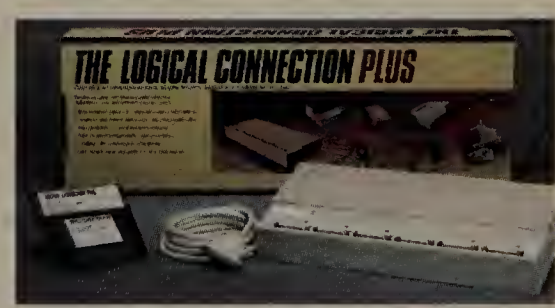


LC-512Kb $495

The **Logical Connection** has eight ports: four bi-directional serial ports which can be set as input or output, two parallel inputs and two parallel outputs.

LC Plus-512Kb $695

All six ports of the **Logical Connection Plus** are automatically configured as parallel or serial, and input or output. Versatility and high speed are key features.



- **UL Listed Power Supplies**
- **FCC Class B Certification (LCJr. - A)**
- **Fast Data Input and Throughput**
- **Socketed DRAM Upgrades to 1Mb**
- **Largest Selling PSDs in the USA**

Logical Connections allow several users to easily share expensive printers and other resources. Choose the peripheral that you need with a pop-up menu or ASCII string.

Multiple users can send data simultaneously since Logical Connections with memory will buffer and queue jobs on a first-in-first-out basis. A 256Kb buffer will hold up to 100 pages of text or about 5 - 10 pages of graphics data.

If your company has a LAN, use Logical Connections for local printer sharing in smaller workgroups, rather than printing centrally through the LAN. Local printing is more convenient and more secure!

LC -41PAS $100

Smart switch to automatically connect up to 4 parallel inputs to 1 parallel output.

SPPS $60

Serial/Parallel or Parallel/Serial converter, no power supply required.

Logical Connection, Inc.
4660 Portland Road NE #108, Salem, OR 97305
FAX: (503) 390-9372
Tech. Support: (503) 390-9375

LOGICAL CONNECTION 800-238-9415 US & Can.

Laptop Memory

Macintosh Powerbook 100 (Dealer must install)

Memory Module	EPB-2000	2 Mb	$275
Memory Module	EPB-4000	4 Mb	$500

Macintosh Powerbook 140/170 (Dealer must install)

Memory Module	EPC-4000	4 Mb	$500
Memory Module	EPC-6000	6 Mb	$750

Toshiba Laptop Models: (User may install)

1000SE/XE/LE, 2000, 2000SX (All Sizes); 2000SXE, 2200SX (exclude 1Mb)

Memory Card	RCT-1000	1 Mb	$150
Memory Card	RCT-2000	2 Mb	$200
Memory Card	RCT-4000	4 Mb	$400
Memory Card	RCT-8000	8 Mb	$700

PC-MCIA 2.0 / JEIDA SRAM (User may install)

For Laptops conforming to this new universal spec.

Memory Card	RJB-0512	512 Kb	$195
Memory Card	RJB-1000	1 Mb	$450
Memory Card	RJB-2000	2 Mb	$750

Circle 126 on reader service card

Audio Gives Business PCs a Voice

Cost, Hassles, File-Size Requirements Slow Adoption

If you have an audio board in your PC, chances are small that your company budget paid for it. Only a tiny fraction of the roughly 2 million audio boards sold in the United States this year will end up being put to use in business PCs, estimates Joan-Carol Brigham of International Data Corporation.

But this situation is slowly starting to change. As mainstream business applications begin to include sound support and the hassles of installing audio hardware lessen, business users will begin adding sound equipment to create multimedia business presentations, training modules, and voice-annotated documents and E-mail.

"To actually get E-mail through voice is appealing," says Terry Young, applications developer at Chicago's Sidley & Austin law firm. "A lot of times people can't type fast. Especially in the law environment, time is money. If you can say something instead of having to type it, voice annotation is definitely appealing."

Making Sound Quick and Easy

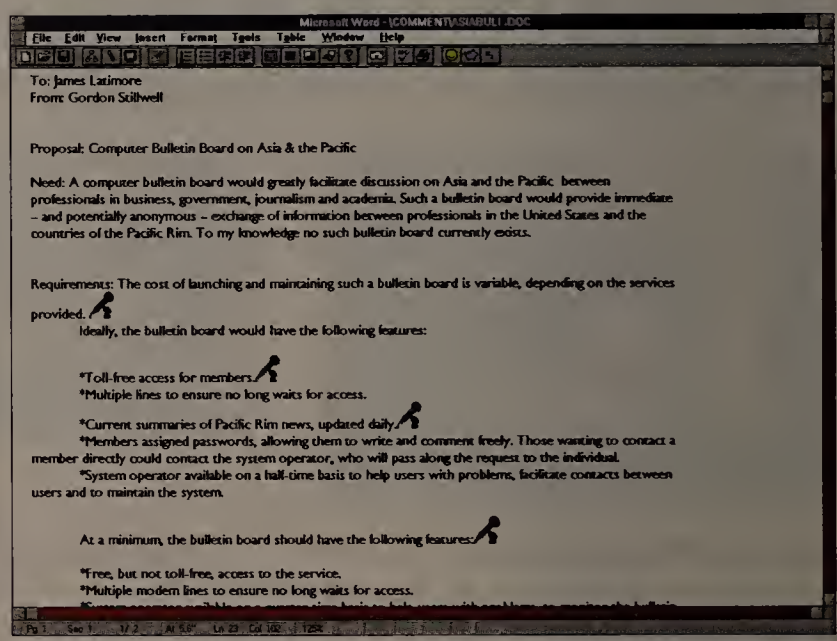
Basic sound support is now embedded in *Windows 3.1* for any package that supports *Windows'* OLE application-to-application links. This capability has encouraged software developers to write such products as a version of *1-2-3 for Windows* that incorporates multimedia help, and encouraged major PC suppliers to start embedding audio support this year. "Sound is going to be an important data type for businesses," says Steve Barlow, Lotus Development's multimedia product manager. "Over time it will be ubiquitous."

Additionally, prices for add-on audio hardware are reasonable. You can get basic sound capabilities, which should suffice for everything except presentations, for around $100.

Even more key than price, Barlow says, is an "upgrade path of least resistance." Ripping open machines to add sound boards can be expensive and time-consuming, so hardware manufacturers are starting to offer other solutions.

ATI in Scarborough, Ontario, for example, has combined audio and video capabilities on its VGAStereo F/X, a high-resolution VGA board with digital sound and an FM synthesizer that lists for $399.

As hardware prices fall and suitable software arrives, one major snag remains to be ironed out: Files containing sound tend to be inordinately large. Indeed, a single minute of sound recorded with the *Windows 3.1* Recorder occupies about 1.3MB of disk space. Compression techniques can reduce that size by about 80 percent, but it still won't take too many voice notes to bog down your disk drive or your company's network.



Windows 3.1 lets standard applications such as Word for Windows handle voice annotations if you have the proper hardware.

Media Vision of Fremont, California, and a few other companies have developed sound devices that can simply be plugged into a free parallel port. The palm-size Audio Port contains a small built-in speaker in addition to jacks for running external speakers. The unit lists for $199 and runs either from batteries or from an AC adapter.

Vendors including Analog Devices and a Texas Instruments/IBM project are developing digital signal processing (DSP) chips that act as engines for such tasks as receiving and decoding fax transmissions and handling vocal annotations to text. Buy a DSP expansion board, and you won't need a modem, fax board, or sound board. IBM intends to start slapping a DSP chip on motherboards early next year—an easy and cost-effective way to offer audio.

That's a major concern for the Prudential Insurance Company of America, which plans to add both voice and video capabilities to a network that links offices in New York and Minneapolis.

Still, that problem should be solved by a high-speed link between the offices, according to John Richmond, network manager for Prudential's Select Marketing unit. "I'd like to bring our offices closer together to simulate being in one office," he says. "Through voice and video, I think we can accomplish that."

—*Patrick Marshall*

Anita Amirrezvani is a contributing editor for PC World, *and Patrick Marshall is a freelance author in Silver Spring, Maryland.*

Audio Options Grow in Volume

A sample of leading audio add-ons for PCs

Basic soundboard
Creative Labs' Sound Blaster, $149.95

High-end soundboard
Creative Labs' Sound Blaster Pro, $299.95
Media Vision's Pro AudioSpectrum, $349

Parallel port device
Media Vision's Audio Port, $199

Audio/graphics adapter
ATI VGAStereo F/X, $399

Programmable digital signal processing (DSP) boards
Products based on Analog Devices or Texas Instruments/IBM technology, pricing not yet set

If you're looking to add sound to your PC, you'll find a wide variety of options—some available for as little as $100 on the street. These prices don't include microphones and speakers, however.

LOGITECH MICE

REVIEWER'S NOTEBOOK: *Here's the entire line of precision-crafted, meticulously engineered Logitech mice. Along with their cousins, the Logitech 256 grayscale scanner and the amazing FotoMan, these award-winning pointing devices cover every need. Our favorite is the sleek new Trackman, perfectly contoured to the human hand, enables you to work quickly, with streamline "glide-and-click" action. Great for desktop publishing and word processing — try it once and you'll never be able to use an ordinary mouse again.*

The advanced new Logitech 256 ScanMan remains the finest hand scanner you can buy. With its new "virtual page scanning" technology, you can scan a larger image than using a full-page scanner! And only the ScanMan delivers full 256 grayscale images, rich with brilliant detail. Nothing else comes close. Excellent instrument for graphic designers.

The Logitech FotoMan has become one of our biggest sellers, bringing digital photography to the PC desktop. Throw FotoMan into your briefcase and take pictures on the road — and instantly download them from the camera directly to your PC.

TrackMan

The TrackMan Stationary Mouse gives you the precision of a mouse, but stays still on your desk. Logitech, the world's leading mouse experts, designed TrackMan so your fingers rest comfortably on the buttons and your thumb easily controls the ball. This advanced design features an ergonomic shape which is angles to fit your hand for hours of extra comfort and productivity.

TrackMan Portable

$15 MANUFACTURER REBATE!

Whether you're on the road or in the office, TrackMan Portable puts Logitech power and convenience in a format that's ideal for portable systems.

- Attaches to either side of a portable keyboard, so it requires no deskspace
- Small, lightweight and easy to handle
- Easily adjusted for comfortable use with either right or left hand
- Also comfortable and easy to use with your desktop system. Just plug in the 5-foot cable extension and start working.

MouseMan

$10 MANUFACTURER REBATE!

MouseMan is not just another mouse. Designed with nearly a decade of mouse experience and the feedback of ten million users worldwide, Logitech's MouseMan is the next step in mouse evolution. Specifically tailored for you, in right-and left-handed versions, MouseMan provides maximum comfort, reliability and power.

Make Friends With Kidz Mouse!

Fun and smart, Kidz Mouse puts children in touch with their computer so they can learn educational programs, do their homework and play games. Kidz Mouse is a perfect fit for small hands, because it's designed specifically for children. Clicking the mouse button "ears" opens up a whole new world of computing for them.

The Cordless Mouse

$15 MANUFACTURER REBATE!

The only problem with this new innovation from Logitech is that you'll have to get used to NOT POINTING IT AT YOUR MONITOR! The MouseMan is a cordless, three-button, radio-controlled mouse! No cables, no line-of-sight positioning! The radio receiver can be placed anywhere — even under your desk — and still allows you to work with precise movement. It's fully Microsoft compatible and includes Mouse-2-3, designed for maximum Lotus 1-2-3 productivity.

LOGITECH MICE

BBU2588	**TrackMan Combo**	**$89.00**
BBU2591	**TrackMan Portable**	**$99.00**
BBU2200	**MouseMan MAC**	**$89.00**
BBU2595	**MouseMan (Cordless Mouse)**	**$99.00**
BBU2596	**MouseMan for Serial & PS/2**	**$69.00**
BBU2589	**Kidz Mouse**	**$49.00**

Rebate Offers End June 30, 1992. Call for details.

INSTANT DIGITAL SNAPSHOTS!

Introducing The Incredible New Logitech FotoMan...

REVIEWER'S NOTEBOOK: *What is it? In short, it's a portable, digital camera — for your computer. FotoMan takes great pictures with amazing clarity and 256 grayscale richness — then allows you to instantly download them to your PC. It includes a slew of image editing tools that open a world of creative opportunity, and is compatible with virtually all desktop publishing programs. The applications for this new technology are enormous. Insurance and real estate professionals are using it to expedite claims and transmit photographs of neighborhoods and homes. Manufacturers use FotoMan to quickly catalog products and parts, while law enforcement officials are using it to photograph suspects, crime scenes and evidence — without the time and expense of film.*

There are hundreds of practical uses for this new product, but we found FotoMan was also a lot of fun. It comes with an automatic flash, one-button operation and a field of focus from three feet to infinity. FotoTouch provides a sophisticated range of features including 256 grayscale editing. It's one of the hottest new ideas in computing: the digital photograph — taken by a small, portable and easy-to-use camera that allows instant transfer to your computer — without a digitizing board or other hardware.

In the past, getting a photograph into your PC meant using a traditional film method. The film would first be processed into either slides or prints, then scanned or stripped into your document. Now just snap a photo of a new employee, for example, and send it directly to the corporate database. Once the images are downloaded, FotoTouch shows you miniature versions so you can choose the image you want. When you've got your shot on-screen, the FotoTouch software allows you to easily make modifications. Then save your image in either TIFF, CCIT, BMP, PCX or EPS format. There's no film, no developing and no waiting!

LOGITECH FOTOMAN

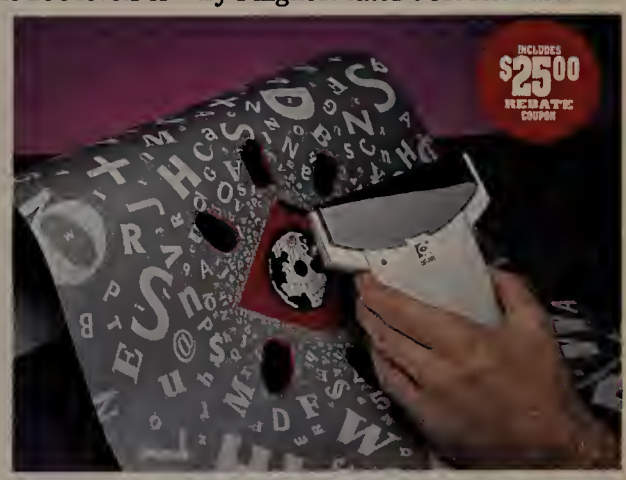
BBU2592 **FotoMan** **$599.00**
Call for requirements.

Merges Multiple Scans Together–Seamlessly!

When we first introduced the ScanMan Model 256 Grayscale hand scanner last year, it met with a roar of enthusiasm. We published the results of our testing — unbelievably sharp scans, with crisp, rich detail and 256 levels of gray. Scanning photos, illustrations — and text — was instantly taken to a new level. In head to head testing, we found the Logitech ScanMan Model 256 to be more versatile, faster and capable of producing large crystal-clear images. The 256 levels of gray add more depth and realism to all your scanned images. Logitech had created the ultimate hand scanner, the hottest new product of the year.

But when you work with Logitech, you come to understand that they never sit still. While the ScanMan Model 256 was sweeping the industry (*PC Magazine's* "Editor's Choice," *InfoWorld's* 1991 "Product of the Year," *PC Computing's* "Most Valuable Product of 1991"), they were at work designing an enhancement that would catapult it to another level entirely — a completely new category of scanners. The innovation: Virtual Page Scanning. The Technology: the Logitech Autostitching feature. It automatically "stitches" 2, 3, — even 4 scans together (so it can handle more area than an 8.5 by 11 flatbed scanner!). No other scanner we've ever seen can automatically merge scans into one completely seamless image. The ScanMan Model 256 smooths and de-skews the stitch, while evening the tones across the scans for remarkable images.

ScanMan Model 256 comes with Perceive Personal, one of the industry's highest-rated OCR software.



$25 MANUFACTURER REBATE!

Rebate coupon included in box.
Offer expires June 30, 1992.

LOGITECH SCANMAN

BBU2593 **ScanMan Model 256 with Perceive** **$299.00**
Please call for system requirements.

Prices Pulverized On Quality Hayes Modems!

...Now There's No Reason To Settle For Anything Less Than The Best!

REVIEWER'S NOTEBOOK: *Hayes modems are legendary for their superior design, engineering, materials and of course, their reliable performance. The vision of Dennis Hayes back in the early 80's has established his company as the leader in PC communications hardware. But there are two misconceptions here. First, everyone thinks that since Hayes is state-of-the art, that it's more expensive. Not true. Second, everyone also thinks that Hayes makes hardware only. Again, not true. Hayes brings you premium product performance at the same price you'll pay for an off-brand modem. They also produce award-winning communications software products that exploit the power of their modems like no other software really can. We're taking a look at the classic OPTIMA 96 and Pocket 2400 modems (the best in the business), along with Hayes Smartcom Exec and Smartcom III software.*

The OPTIMA 96 contains a very important feature known as "Data Compression", allowing it to exchange data at four times its 9600 speed, producing file transfers at the incredible speed of 38,400 bps over regular telephone lines. Hayes set the standard in modem communications — they know what they're doing. It protects your data with the most extensive set of error-control technologies ever introduced, giving you flexibility and peace of mind.

The OPTIMA 96 provides backward compatibility with earlier error control protocols such as MNP; it supports speeds ranging from 300 bps to 9600 bps to talk with almost any modem ever sold. When you crack open the OPTIMA 96 box, you'll notice that there's a free gift inside: Smartcom EZ Communications Software. A smash-hit in stores for $49, Smartcom EZ is a great starter set for the communications novice. Instantly allows access to the wonderful world of connectivity. The world of on-line information is growing at a staggering rate, opening up educational and financial opportunities. Simple steps put you in touch with on-line services, bulletin boards and other personal computers with a modem — with big savings on memberships.

The Hayes Pocket 2400 Modem.

Tiny little thing... just 2" by 3" (and less than an inch thick), the perfect modem for laptops. Smaller than a deck of cards, the Pocket 2400 contains all the design graces and solid engineering that goes into every Hayes modem. This itsy-bitsy 2400/1200/300 bps communicator comes with everything you need to get underway immediately: includes FREE Smartcom EZ software, telephone/computer cables, carrying case and ironclad two year warranty. The Pocket 2400 needs no batteries — drawing its power requirements directly from the phone line.

Smartcom Exec Communications Software.

Hayes wrote the book on PC communications technology, so it's only natural that they write the best software product to go with their fine line of modems. Smartcom Exec combines simple, straight forward operation with remarkable power and flexibility. Everything is here: the most popular terminal emulations and file transfer protocols, an on-line text editor, a handy phone book database (that automatically stores calling information), a powerful (yet simple to use) scripting language and more.

Smartcom III Communications Software.

The ideal business communications software. Supports modem sharing on a LAN and offers a vast array of popular terminal emulations, CCITT X.32 (Dial-up X.25) multi-session support, error control file transfer protocols, a full-featured text editor, powerful SCOPE scripting language, file scrambling and advanced compression technology and more. Smartcom III supports the sharing of either a single modem or multiple modems on popular asynchronous communications serversL. There's also support for network printers.

HAYES

BBU3127	**Smartmodem OPTIMA 96**	**$495.00**
BBU3128	**Pocket 2400**	**$175.00**
BBU3125	**Smartcom Exec Communications Software**	**$79.00**
BBU3126	**Smartcom III Communications Software**	**$129.00**

Call for system requirements on individual modem/software configurations.

The 99.9% Accurate OCR Software For Windows.

REVIEWER'S NOTEBOOK: *Who has time to re-type text? If you own a scanner, you'll never have to consume precious hours duplicating work again. New ReadRight Personal is the most accurate Optical Character Recognition (OCR) software we've seen, delivering 99.9% accuracy in our testing (it missed two commas and a period). Every word, regardless of the attributes or formatting was precisely recorded using our Logitech ScanMan and ReadRight Personal. That scanned text (from a magazine article) was then instantly available for use in any software application. Amazingly accurate, fast and simple.*

ReadRight offers a host of innovative new techniques that propel it far beyond the competition. There's advanced page decomposition (which automatically separates text and graphical elements even on complex page layouts), intelligent merging of scanned "strips," dynamic page display, immediate recognition feedback and complete error checking. The "Accurate Omnifont Technology" technology automatically recognizes a wide variety of font sizes and designs — even when they're mixed on a single page!. There's no need to "train" the software to recognize the characters. ReadRight can accurately scan typewritten, laser-printed, typeset and NLQ dot-matrix. ReadRight reads them all with unmatched precision.

Designed specifically for the Windows environment, ReadRight allows various zoom levels for close examination of scanned areas. The Toolbox defines, deletes, magnifies and selects areas of your scan and allows you to then customize the content and format of the areas to increase accuracy during recognition.

No DDE or Clipboard Needed!

You can even copy text directly via the exclusive Autopaste™ option and paste it into other Windows applications.

READRIGHT

BBU3281	**ReadRight** 3½"	**$199.00**

IBM AT, PS/2, or 100% compatible. 4MB RAM. Hard disk. Microsoft Windows (3.0 or higher). MS-DOS or PC-DOS (3.1 or higher). Mouse.

The Finest Removable Hard Drives Made.

REVIEWER'S NOTEBOOK: *Highly acclaimed, 100% reliable and backed by a solid warranty, the PLI line of removable cartridge drives is the most respected in the industry. When your files and applications grow to monumental size, when you want to perform fast backups or when you want to take heavy megabytes on the road, nothing gives you the unlimited capabilities of the PLI Infinity 44 and 88mb drives. The PLI Cartridges carry a full 5-year warranty. One other note: The PLI drives and cartridges are thoroughly tested, far exceeding industry standards, so when you install a PLI, you're ready to go — with uninterrupted performance.*

With much of the design and layout work done at TigerSoftware on PCs, our PLI cartridge drives are critical to a smooth operation. Without their reliable service and unmatched speed, getting our hands on files would be nearly impossible. Our choice: the PLI Infinity 88 Turbo drive. This remarkable instrument carries a 60,000 hour MTBF (Mean Time Between Failure) rating. That's over 6 years between down time! It features the highest level of filtration, quality-engineered circuitry and is virtually impossible to damage by incorrect cartridge insertion (a leading cause of drive failure).

Of course, you'll get all the features that have made PLI the name asked for most when it comes to removable cartridge drives including external switches for termination and SCSI address, UL-approved, individually tested power supplies, long-life 50-pin Centronics SCSI connectors, an external fuse and (unlike other drives) you get the complete kit, with all necessary cables and accessories.

FREE WHEN YOU BUY A PLI DRIVE AND ONE CARTRIDGE
NORTON DESKTOP AND NORTON UTILITIES FOR DOS OR WINDOWS — "YOUR CHOICE"

PLI DRIVES & CARTRIDGES

BBU2460C	**Infinity 88mb Removable Single External Drive**	**$845.00**
BBU2460D	**Infinity 44mb Removable Single External Drive**	**$799.00**
BBU2465A	**88mb Cartridge** (Unformatted, 1-yr. war.)	**$179.95**
BBU2465B	**44mb Cartridge** (Unformatted, 1-yr. war.)	**$89.95**
BBU2465C	**88mb Cartridge** (Formatted, 5-yr. war.)	**$159.95**
BBU2465D	**44mb Cartridge** (Formatted, 5-yr. war.)	**$115.00**

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THESE ARE STATE-OF-THE-ART MULTIMEDIA SETS. NOTHING ELSE TO BUY!
FULL MOTION VIDEO! DIGITAL SOUND! 19 FREE CD TITLES!

REVIEWER'S NOTEBOOK: *The dizzying impact of sight, sound and motion is not easily forgotten. Our first experience with Multimedia CD-ROM felt like entering a new world — it grabbed our senses! If you make presentations or conduct training, adding sound and motion will yield incredible results: it's fun watching an audience with their mouths hanging open — completely entranced by what they're witnessing! This hot new technology enhances communication, there's nothing quite like FULL MOTION VIDEO. We've included 19 smash CD software hits to get you going — that's thousands of diskettes worth of information. These discs are packed with mesmerizing sound, magnificent animation and video, language lessons with spoken pronunciations, gripping games, color-drenched maps and plenty of information — with the added dimension of stereo sound. The world of Multimedia CD-ROM is here.*

Tiger has two complete multimedia packages to choose from. The first, features the CDR 37M, the ultralight, portable reader with zippy response times and rugged NEC quality. You also get the complete interface kit, including all the cables you'll need, a professional sound board, Microsoft's Windows extensions, a pair of high quality Persona Micro speakers (that pump out bonecrushing sound), and a special bonus that you'll only find in these bundle: It's called CD Speedway and it accelerates your CD-ROM drive up to 1000%! Some titles will run up to 7000% faster! The CDR 74M is the fastest reader in the world! Breathtaking 280 millisecond response speed and a brand new design incorporating state-of-the-art optical technology. Of course you get all the goodies: Full NEC interface kit, Giant Persona speakers, all the cables, industry-acclaimed MediaVision audio board, 19 CD ROM current-release titles, the sleek CD Caddy, stereo headphones and CD Speedway! Includes CD Version of Q & A — FREE!

The Value-packed CDR 37M package includes everything you see here. Includes high-quality Persona Micro Speakers for crisp, digital audio! Also includes new CD-Speedway — makes any CD-ROM reader up to 1000% faster!

THE CDR-37 MPC BUNDLE

The CDR 74M package is a monster — over $4800 in multimedia equipment — yours for just $1399!

Get everything you see! A complete multimedia video/audio setup — nothing else to buy! Plus 19 smash hit CD titles!

THE CDR-74 MPC BUNDLE

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CDR-37 MPC BUNDLE	Retail Value	CDR-74 MPC BUNDLE	Retail Value
CDR-37M CD-ROM Reader	$449.00	CDR-74M CD-ROM Reader	$675.00
Complete Interface MPC Kit with Audio Board & CD-ROM SCSI Interface	428.00	Complete Interface MPC Kit with Audio Board & CD-ROM SCSI Interface	428.00
Microsoft 3.1 Multimedia Extensions	79.95	Microsoft 3.1 Multimedia Extensions	79.95
Persona Micro Speakers	80.00	Persona Deluxe Speakers	229.00
Multimedia World Atlas	149.00	Multimedia World Atlas	149.00
U.S. Atlas & Automap	99.95	U.S. Atlas & Automap	99.95
Reference Library	149.95	Reference Library	149.95
Time Compact Almanac	199.95	Time Compact Almanac	199.95
Toolworks Illustrated Encyclopedia	395.00	Toolworks Illustrated Encyclopedia	395.00
Guiness Book of World Records	79.95	Guinness Book of World Records	79.95
Family Doctor	79.95	Family Doctor	79.95
TigerSoftware Demos	99.95	TigerSoftware Demos	99.95
Multimedia Great Cities of the World	99.95	Multimedia Great Cities of the World	99.95
Multimedia Mavis Teaches Typing	99.95	Multimedia Mavis Teaches Typing	99.95
Bible Library	595.00	Bible Library	595.00
Mammals	149.00	Mammals	149.00
TimeTable Science & Innovation	99.95	TimeTable Science & Innovation	99.95
U.S. History	395.00	U.S. History	395.00
Game Pack II (12 Smash Hit Games)	79.95	Sherlock Holmes	69.95
Wing Commander & Ultima VI	99.95	Multimedia Chessmaster	99.95
Monkey Island	79.95	Game Pack II (12 Smash Hit Games)	79.95
CD Speedway	99.95	Wing Commander & Ultima VI	99.95
CD Launch & Play Menu Disk	99.95	30 CD-ROM Holder	29.95
Q&A	399.00	Loom	79.95
		Monkey Island	79.95
		CD Speedway	99.95
		CD Launch & Play Menu Disk	99.95
		Q&A	399.00
Total Value	**$4588.25**	**Total Value $5243.05**	**Your Price $1399.00**

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The #1 Database And Word Processor For Business. When you purchase either Tiger CD-ROM bundle on this page, or any Multimedia CD on the opposite page, you'll receive absolutely FREE — Q&A on CD-ROM. This remarkable product is the industry's Number One database and word processor designed specifically for business. Instant database power, with direct SQL links. The full-featured word processor enables you to zip through letters, reports, presentations with the greatest of ease. A $399 Value Free!

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The Solar System On Your PC.

REVIEWER'S NOTEBOOK: *An explosive new hit title. Sometimes you take the dazzling beauty of our planet, our solar system — and if we dare imagine — the universe. Since the early astronomers aimed their primitive telescopes toward the sky, man has worked with curious passion to understand how the universe began, how it sustains itself — and what its future holds for its only (known) inhabitants. Orbits will ignite your family's interest in the nature of our universe. Packed with facts, brimming with vivid illustrations and interactive simulations.*

Orbits is a brilliantly interactive space simulator and comprehensive space atlas that brings the universe to your PC! Spectacular 3-D graphics demonstrate the operation of our solar system. Animated sequences show you the effects of gravity on various planets, the movement of the sun and moon. Compare the planets' characteristics, structure, chemical makeup and more. Simulations of eclipses, nuclear processes of the sun and the life of comets. View actual satellite photographs from NASA and the Jet Propulsion Laboratory, watch a spectacular presentation on the birth and death of the sun. See the interior structures of the sun and moon, create reports and comparisons on anything, and play a few rounds of Orbit-Trek, the built-in brain teaser. A great educational tool, Orbits is also an entertaining way to spend some time with your PC. It brings the stars, the planets and beyond — into focus.

Orbits is packed with so many intriguing, colorful screens and great information that it's hard to stop. It has been meticulously researched, the graphics professionally prepared. More than an astronomy program, Orbits takes you to the wonders of the universe — and gives it an interesting spin! For instance did you know... where a world shaped like a peanut exists... or where a storm that could swallow our entire Earth has raged for over 300 years... or where two moons may actually exchange orbits? These places are real, and on a cosmic scale they are really not so far away.

This is a great program for students — even smaller children enjoy learning about the heavens. A fascinating new title that's fun.

ORBITS

BBU4103-5 **Orbits** 5¼" **$59.95**
BBU4103-3 **Orbits** 3½" **$59.95**

A Guided Tour of the Human Body.

The human body. A perfect machine. It grows and develops, protects and heals itself and is designed to last for decades. Now the wonder of the body is combined with the power of the PC to produce a fascinating journey into its structure and functions. You'll see detailed, full-color graphics of the entire human body and a comprehensive database of facts, descriptions and explanations. Do you know the exact function of the hypothalamus? How about the kidneys? How do bruises heal or your brain work?

Experience a world of knowledge and beauty that provides profound insight into life itself. It's called BODYWORKS, and it could be the most interesting software program you'll ever own — perfect for students, artists and hobbyists.

Since your body doesn't come with an owner's manual, BODYWORKS is a great way to learn and understand how it operates — and how you can keep it running at peak performance. Its elegant design and high quality color illustrations are as good as any we've seen. We've seen a great interest in schools for products like BODYWORKS, where so much data is at the user's fingertips. It's a faster way to learn, and since it is highly visual, the information is easier to understand. In fact, curiosity is all you or your child needs to embark on an amazing voyage inside the human body.

JUST RELEASED!

NEW CHEMISTRY WORKS

Discover fascinating secrets about the 108 elements in the Periodic Table.

SPECIAL BUNDLE

BODYWORKS & Home Medical Advisor

Both For Just $99. You Will Save $40

BODYWORKS/CHEMISTRY WORKS

BBU4101-5 **Bodyworks** 5¼" **$59.95**
BBU4101-3 **Bodyworks** 3½" **$59.95**
BBU3861-5 **Medical Bundle** 5¼" ... **$99.00**
BBU3861-3 **Medical Bundle** 3½" ... **$99.00**
BBU4102 **Chemistry Works** Dual .. **$69.95**

The Intelligent Road Atlas For Your PC!

Planning a vacation? Heading out on the road on business? Now there's a system that helps you plan any road trip for fastest, prettiest or most convenient route — right on your computer screen.

Clear, detailed maps that can get you anywhere in the United States that you want to go. Just tell AutoMap where you're going, when and where you'll be starting from, what areas you'd like to avoid, what areas you'd like to visit on the way and how you like to drive.

Take Me Home, Country Road.

One of the great joys of automobile travel is just takin' it easy and seeing the country. I used AutoMap recently on a family trip to chart a course through the Carolinas. We had a long list of things we wanted to see and we wanted to do it all without getting on a super highway.

Just select your starting point, end destination, and areas to visit and let AutoMap create a detailed map of your next trip!

We threw it all into AutoMap and instantly had detailed maps, printouts and directions. AutoMap provided several different routes that would let us all do exactly what we wanted. It gave us travel times, mileage, information on hotels and the parks themselves. AutoMap also provided information on the cities we wanted to visit. What a great vacation planner!

ALL NEW! AUTOMAP EUROPE.

Scope Out The Autobahn — On Your PC.

REVIEWER'S NOTEBOOK: *Just Released! Tiger is proud to be among the first to have AutoMap Europe in stock and ready to ship. The makers of AutoMap have created the definitive guide to discovering Europe by car. AutoMap Europe is perfect for sightseers, student travelers, business planning or that once-in-a-lifetime vacation. Over 250,000 miles of motorways.*

BUY AUTOMAP—GET USA ATLAS FREE!

AUTOMAP

BBU4098A **AutoMap** 3½" **$69.95**
BBU4098B **AutoMap** 5¼" **$69.95**
BBU4106 **AutoMap Europe** Dual . **$99.95**
Hercules, CGA, EGA, VGA, 512K RAM, hard disk, mouse recommended.

Do You Know How Your Car Works?

REVIEWER'S NOTEBOOK: *Unless you're an auto mechanic, you probably have no idea how a fuel injection system works, how a transmission works, how a car's suspension system operates — or even how the ignition actually operates. It's quite interesting...*

The automobile is a masterpiece of engineering. Today's cars are filled with fascinating mechanisms, systems and ingenious devices. AUTOWORKS examines the automobile from bumper to bumper: from a basic overview of each system, to in-depth graphics and explanations of how your brakes, belts and suspension work. Animated sequences illustrate your automobiles components and detailed diagrams are everywhere.

Just a few minutes and you'll be hooked. You'll want to know how your gas gauge and speedometer works, your engines' lubrication system, pistons, your air conditioner, brakelights, alternator — everything!...Also a great education on topics like emission control, ethanol fuel, electric cars, diesel engines, turbochargers vs, superchargers, rustproofing, unibody construction, auto safety standards, and more. Sit down with AUTOWORKS before you start looking for a new car and know what you're buying.

AUTOWORKS is like having the ultimate owner's manual for your car. You'll find out exactly how the power generated by your engine (through combustion) is transferred from the crankshaft, to the drive train and on to actually turn the wheels. It's an amazing design feat. See how the gears work deep within the transmission's housing, and the gearbox controls the delivery of power to the drive shaft. Find out how the internal combustion engine creates all that horsepower. Even the most complex part is exploded and explained. Which means you can learn as much as you want about how a car works — down to the tiniest technological marvel.

AUTOWORKS

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THE TIGER SUPER-UTILITY PACK!

REVIEWER'S NOTEBOOK: *An outstanding software value! Over $548 in current, best-selling releases in a value-stuffed offer only Tiger could make. FAST!, 386MAX, Software Carousel, Disk Optimizer, SuperStor and PCRx — all together and ready to go to work on your system. It is the ultimate tool box.*

Remember, these are all newest releases — no older versions of unknown products — which makes this offer even more irresistible. If you own a PC, this Pack is all you'll ever need to maintain it and keep it running at peak performance, plus get the extra performance of blistering speed (FAST! makes your PC run up to 600% faster). 386MAX is the legendary memory manager that simply tears up the competition, serving up more memory than QEMM, DOS 5, Netroom or Turbo EMS.

PLUS, a last-minute addition! — The Norton Backup! It automatically schedules backups and includes Norton Backup for Windows! Norton Backup is lightning fast, handling 3.5Mb per minute!

That makes SEVEN incredible products!

FAST!

Trapped deep within the architecture of your computer lies an enormous untapped potential for speed. Unfortunately, this vast resource has been neglected because no one could devise a way to unleash it. Until now.

FAST! is the brilliant caching system that actually increases the speed of your computer by up to 60 times! Simple to install, a snap to use, this software solution can make an XT with expanded memory outrun a full-blown 386! In tests, we loaded a 386 with FAST! and we almost blew the doors off the lab!

One of the keys to the FAST! design is the addition of "intuitive logic" tot he technique of caching, so your system actually anticipates what your CPU will be seeking and reads the information directly from the hard disk (or floppy) into a special buffer created within your RAM. This information is, in reality, retrieved before the system asks for it!

As a result, your CPU simply spends no time waiting for disk reads, so processing can be done as fast as the system is capable — faster than you've ever seen it! The more disk-intensive the application is, the more dramatic the increase in speed can be achieved using FAST!

On a standard data transfer performance test, FAST! is 18 times faster than a standard AT — and 5 times faster than the leading competitor. In fact, an IBM XT with FAST! is faster than a Compaq DeskPro 386!

SOFTWARE CAROUSEL!

Imagine switching programs on your computer as quickly and easily as you change channels on your TV! No more 10 step routines just to exit one program to work in another. Just switch and you're in your spreadsheet for work on the budget. Switch — you're in your word processor to zip off a memo. Switch over to your database to add items to your mailing list and then just switch back to your spreadsheet — to the exact spot you left off!

Software Carousel 6.0 allows you to load up to 12 programs when you begin work and simply switch between them all day long. Or, load several sessions of the same program — each with a different file — and snap back and forth.

If it runs on your IBM PC or compatible, it runs with Software Carousel. No modification or special files needed. No lost features or clumsy windows.

DISK OPTIMIZER!

When your hard disk was new, it ran lean and swift, retrieving files in just a few seconds. But as you added programs and files, your hard disk became fat and sluggish. The fact is a fragmented, "dirty" hard disk can take up to 100 seconds to retrieve a file that used to take 10 seconds — ***that's 10 times slower!***

The problem? Fragmentation kills hard disk performance. It causes excessive head movement across the media, creating bad spots throughout the drive. It's aggravating and dangerous! A fragmented hard disk, left unmaintained, is almost certain to crash. That means major data loss. Disk Optimizer 4.0's easy-to-use menus makes maintenance simple.

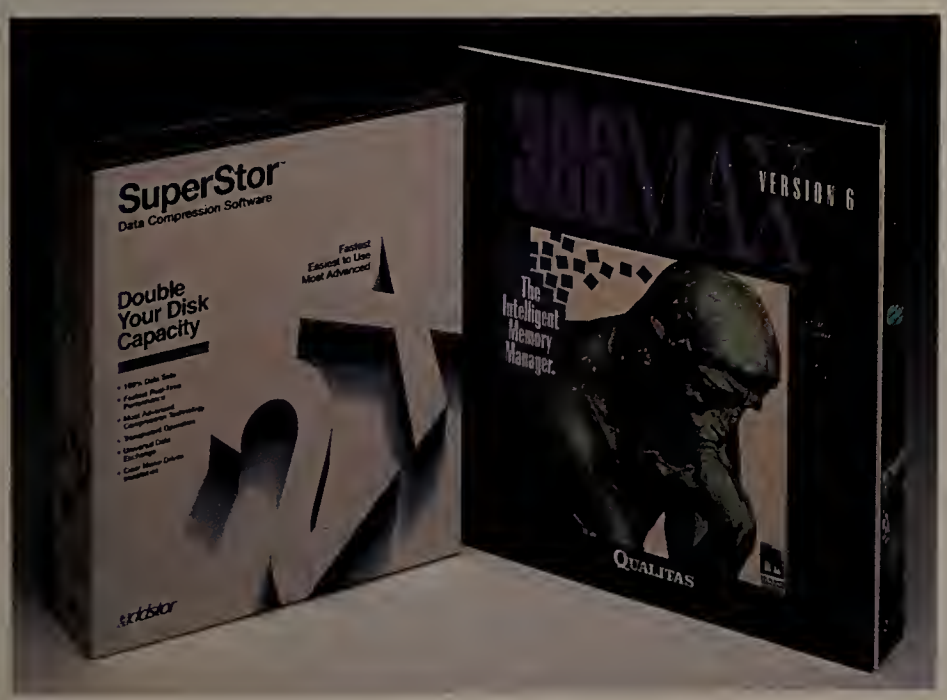
After un-fragmenting with Disk Optimizer, a file that once occupied 20 different sectors in 20 different locations is now in one contiguous piece. The next time your drive reads it, there's just one place it has to look. Performance times may be cut by as much as two thirds.

SUPERSTOR!

This unique product, unlike conventional file compression software, employs sophisticated "on-the-fly" compression algorithms to expand the storage capacity of your drives (hard disk or floppy) by up to 300% — and in many cases more! You can store 2 to 3 times more on your hard drive without giving up speed with this new technology... old technology gives up speed to get space.

SuperStor is simple to install and is 100 percent guaranteed for safety. You don't have to buy any new hardware, fiddle with jumpers, switches, hardware interrupts or even open your computer! Just slip in the diskette and you'll instantly notice significant increases in capacity and speed.

It all adds up to the most extensive disk maximization system on the market today and an absolute must for any computer user.



386MAX

New 386MAX is the best memory manager on the market today. It beats the competition hands down because it recovers more memory and is the easiest, fully automatic, most advanced memory manager in existence. 386MAX provides hungry applications with memory — any kind of memory. It recovers massive amounts of high DOS memory and does a *better* job of freeing conventional memory with advanced tools like these:

- **ROMsearch™** reliably recovers huge holes of unused system BIOS.
- **VGAswap™** provides more contiguous memory by automatically relocating video ROM on all EGA and VGA systems.
- **Maximize Reordering** automatically optimizes the loading of programs into high DOS.

PCRx

PCRx is the perfect anti-virus solution for notebook computer users or if you're computing in a LAN environment. The secret is a compact, 10K TSR filter that creates a virus behavior rule base which monitors virus characteristics and infection mechanisms, so PCRx predicts every possible move a virus can make before it infects! Even treacherous new strains are instantly spotted and conveniently removed with PCRx.

PLUS, a last minute addition! THE NORTON BACKUP — The industry's most respected data protection product from Symantec. It automatically schedules backups and includes Norton Backup for Windows. Norton Backup is lightning fast, handling 3.5 Mb per minute. So automatic — just 3 keystrokes is all it takes!

ALL 7 TITLES—JUST $119.95

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Shipping $10.95 on this bundle.

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Bargains of the Month

The Dell System 325 SX and AST Premium Exec 386SX/25 were the most aggressively priced desktop and portable PCs in the April survey by International Data Corporation.

Best-Sellers

Leading PCs sold through computer stores and traditional dealer channels

1 IBM PS/2 Model 55 SX	6 Compaq Deskpro 386s/20
2 IBM PS/2 Model 70/20	7 Compaq LTE 386s/20
3 IBM PS/2 Model 57 SX	8 IBM PS/2 Model 35 SX
4 Compaq Deskpro 386/25M	9 Compaq LTE Lite/20
5 NEC PowerMate SX/20i	10 Compaq Deskpro 486/33M

Midrange IBM PS/2s still top Storeboard Channel Tracking's March best-seller list, but Compaq's Deskpro 486/33M is the first 486 PC to appear.

Over the Counter

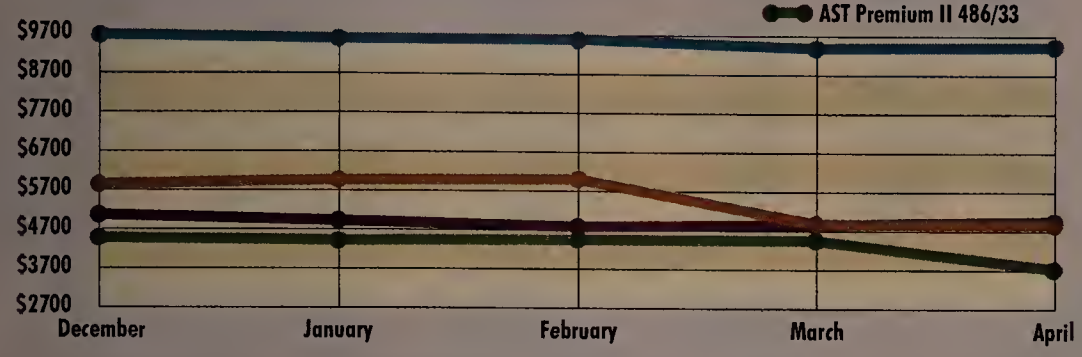
What you pay at retail stores for popular PCs

	Configuration				National				
	Speed (MHz)	RAM (MB)	Hard disk (MB)	Video adapter	List	Average	Boston	Chicago	Dallas/Ft. Worth
80386SX-based desktop PCs									
Compaq Deskpro 386s/20	20	2	60	VGA	$1899	$1721	$1600	$1657	$1880
Dell System 325 SX	25	2	52	VGA	$1050	$1050	$1050	$1050	$1050
IBM PS/2 Model 35 SX-043	20	2	40	VGA	$1610	$1481	$1292	$1411	$1851
IBM PS/2 Model 56	20	2	80	VGA	$3030	$2379	$2316	$2361	$2305
IBM PS/2 Model 56 SLC	20	4	80	VGA	$3560	$2796	$2757	$2780	$2725
NEC PowerMate SX/20i	20	2	60	VGA	$2049	$1535	$1609	$1680	$1525
80386DX-based desktop PCs									
AST Premium II 386/33	33	4	210	VGA	$3795	$3205	$3134	$3074	$3047
Compaq Deskpro 386/25M	25	4	120	VGA	$3199	$2854	$2696	$2733	$3141
Dell System 333P	33	4	100	VGA	$1630	$1630	$1630	$1630	$1630
Gateway 2000 33-MHZ 386VGA	33	4	200	VGA	$1745	$1745	$1745	$1745	$1745
IBM PS/2 Model 70-A16	25	4	160	VGA	$5475	$4207	$4238	$4181	$4285
80486SX-based desktop PCs									
ALR BusinessVEISA	20	5	120	none	$3495	$2944	$2945	$3035	$2899
AST Premium II 486SX/20	20	4	80	VGA	$3495	$2936	$2869	$2824	$2839
Compaq Deskpro 486s/25M	25	4	120	VGA	$3699	$3297	$3116	$3179	$3634
IBM PS/2 Model 90XP-OH9	25	4	160	XGA	$6545	$5040	$5007	$5073	$5117
80486DX-based desktop PCs									
AST Premium II 486/33	33	4	210	VGA	$4495	$3750	$3717	$3628	$3581
Compaq Deskpro 486/33M	33	4	340	VGA	$5499	$4891	$4634	$4726	$5523
Compaq Deskpro 486/50L	50	8	340	VGA	$12,999	$10,985	$10,634	$10,904	$11,577
IBM PS/2 Model 90 XP-OKF	33	8	400	XGA	$12,495	$9436	$9424	$9797	$8950
NEC PowerMate 486/33e	33	4	300	none	$6274	$4969	$4919	$5542	$5414
Portables									
AST Premium Exec 386SX/20	20 (SX)	2	40	VGA-LCD	$2395	$1989	$1984	$2020	$1988
AST Premium Exec 386SX/25	25 (SL)	4	80	VGA-LCD	$3295	$2807	$2780	$2767	$2784
Compaq LTE 386s/20	20 (SX)	2	30	VGA-LCD	$3599	$3050	$2970	$3041	$3112
Compaq LTE Lite/20	20 (SL)	2	60	VGA-LCD	$3199	$2852	$2811	$2823	$3132
Dell System NX20	20 (SX)	2	60	VGA-LCD	$1799	$1799	$1799	$1799	$1799
IBM PS/2 Model L40 SX	20 (SX)	2	60	VGA-LCD	$3645	$2539	$2830	$2819	$2235
NEC UltroLite SL/20	20 (SL)	2	80	VGA-LCD	$3799	$2980	$3006	$3356	$2987
Toshiba T2000SXe	20 (SX)	2	60	VGA-LCD	$3299	$2641	$2729	$2799	$2702
Toshiba T4400SX	25 (SX)	2	80	VGA-LCD	$5599	$4617	$4620	$4759	$4592
ZDS MastersPort 386SLe	20 (SL)	2	60	VGA-LCD	$3999	$3090	$3125	$3080	$3245

From an IDC survey of more than 180 computer dealers in eight metropolitan areas. Figures based on at least four price quotes for each machine. Prices are based on manufacturer's standard configuration without monitor.

Trend Line: 486DX Desktop Prices Slip

Street pricing on selected 33-MHz models over five months



Costs of 33-MHz 486 machines generally dropped by early spring. These systems are under pressure from 50-MHz versions and even newer machines based on Intel's DX2-50 CPU. This DX2 runs internally at 50 MHz and externally at 25 MHz, producing a PC that's cheaper and more powerful than a 33-MHz system. In fact, IBM announced in April that it would discontinue 33-MHz 486s.

Metropolitan

Los Angeles	Miami/ Ft. Lauderdale	New York	San Francisco Bay Area	Washington, D.C.
$1682	$1661	$1749	$1856	$1874
$1050	$1050	$1050	$1050	$1050
$1462	$1571	$1315	$1459	$1482
$2507	$2327	$2454	$2362	$2370
$3020	$2620	$2884	$2763	$2817
$1457	$1519	$1538	$1558	$1430

$3327	$3355	$3200	$3116	$3287
$2682	$2938	$2998	$2937	$2878
$1630	$1630	$1630	$1630	$1630
$1745	$1745	$1745	$1745	$1745
$4472	$3911	$4481	$4078	$4008

$2879	$3024	$2932	$2857	$2987
$2969	$3096	$2880	$2834	$3022
$3107	$3524	$3450	$3402	$3328
$5563	$4748	$5340	$4806	$4824

$3866	$3853	$3721	$3795	$3739
$4578	$5039	$4906	$4944	$4949
$10,529	$11,293	$11,136	$10,681	$11,318
$10,621	$9045	$9892	$9060	$9050
$4726	$5012	$5020	$4954	$5034

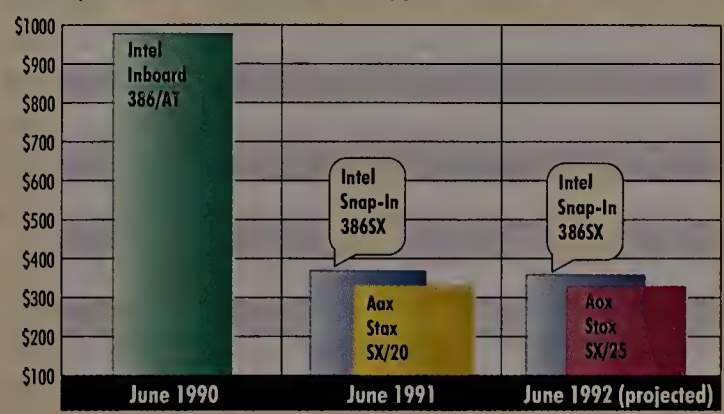
$1986	$2195	$1851	$2063	$1985
$2812	$3028	$2661	$2848	$2979
$2927	$3184	$3169	$2920	$3194
$2728	$2881	$2841	$2857	$2879
$1799	$1799	$1799	$1799	$1799
$2719	$2341	$2384	$2494	$2505
$2943	$2960	$2754	$3019	$3152
$2647	$2801	$2360	$2632	$2842
$4434	$4815	$4537	$4660	$4651
$3024	$2984	$3079	$3059	$3157

PC Futures: Slimming Down for Summer

The Dell System 325 SX corries off desktop Bargain af the Month[1] honors, while AST wins the portoble Bargain of the Manth with the Premium Exec 386SX/25. It's no caincidence thot both these suppliers ore surging past the billion-dollar soles level in o yeor when many competitors ore stumbling. IBM and Compoq still thoroughly daminate the best-seller list, ond Compaq's Deskpro 486/33M is the first 486 PC to shaw up on the roster, but both of these troditionol PC leaders ore struggling to make o tronsition to todoy's low-margin morketploce. Compoq is expected to roll out a low-priced line in June, while IBM seems poised to enter mail-order ond other nontroditionol chonnels. Throughout the industry, system prices keep dropping o notch at o time, as shawn by the 486/33 madels obove. More dromotic price cuts are demonstroted omong direct-sole firms, naw offering respectoble 486/33 systems for under $3000. No matter how much bong they get for the buck with the 486, though, some users will meet their needs effectively and far mare cheoply by upgrading their 286 machines.

Onward With CPU Upgrades

Street prices of selected 386DX or 386SX upgrades to 286-based PCs



While you can buy a 386SX system quite cheaply these days, upgrading a 286 may still be cost-effective. For a few hundred dollars, an SX-based CPU replacement lets you boost performance severalfold and tap software such as Windows that exploits the 386 architecture.

[1] Bargains of the Month are determined by adjusting prices an PCs af a given class far standard memary and starage, then finding which PC campares best.

Saurce: Mail-arder and dealer advertisements

QUATTRO PRO FOR WINDOWS

Borland's Windows spreadsheet, due out this month, uses notebooks and 3-D links to make organizing your worksheets easier than ever.

BY RICHARD SCOVILLE

Here's the scoop: *Quattro Pro for Windows* (*QPW*) provides an easy, familiar metaphor to help you organize your work. By transforming the spreadsheet workspace into a 3-D, multipage "notebook," complete with labeled page tabs, *QPW* makes it easier to manage everyday operations. If you routinely manipulate reams of data, this approach is a breath of fresh air.

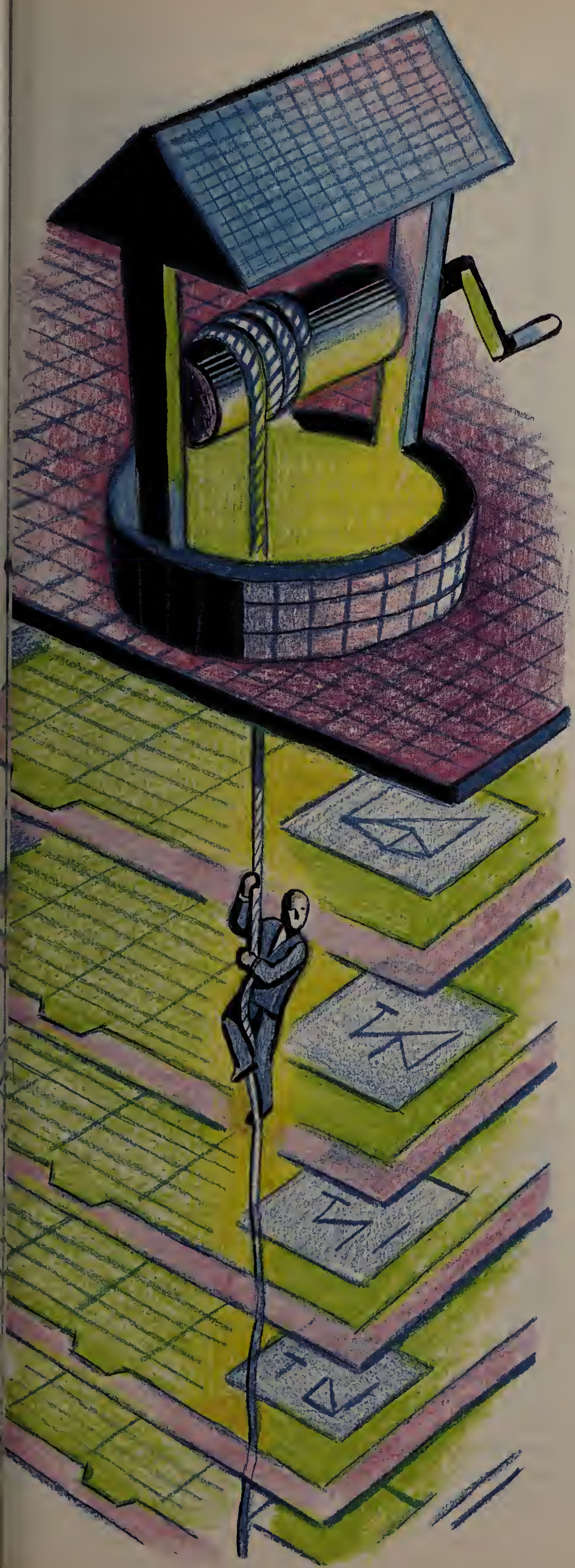
Organization is the big story, but not the only story. Borland's DOS spreadsheet, *Quattro Pro,* wowed us with great graphics; the *Windows* version goes even further, with flashy graphics and slide shows to rival dedicated programs like Lotus's *Freelance Graphics for Windows. QPW*'s integrated dialog box editor makes developing nifty applications far easier for the average spreadsheet user, and intelligent command organization makes navigation efficient. Add tight integration with Borland's upcoming *Windows* data base products, to make spreadsheet access to live server-based data a reality at last, and you have one terrific spreadsheet.

So is *QPW* the best spreadsheet out there? That depends on what you need. It's packed with innovations but is a little rough around the edges: *QPW* lacks some of the refinements that can result only from feedback from thousands of users.

How Does It Look?

Like a notebook. That's great, because keeping large, complex worksheet projects organized, manageable, and reliable has long been a major concern for serious spreadsheet users. It's hard to depend on the results of a worksheet that's built like a dish of noodles, with data and results hidden all over the place. The 3-D worksheet provided by *1-2-3 3.*x and *1-2-3 for Windows* was one solution, but multipage worksheets are primarily a way for users to build 3-D data structures, which most people don't need or understand. More practical are *Excel 4.0*'s workbooks: They offer organization but lack true 3-D ranges.

Now, *QPW* offers 3-D worksheets in the guise of multipage notebooks, an organizational solution that combines the best of both *1-2-3*'s and *Excel*'s approaches. The bottom edge of a *QPW* file displays what look like index tabs in a loose-leaf notebook, labeled from A to IV. Each tab is attached to a standard 2-D worksheet with 8192 rows and 256 columns; to select a sheet, you just click on its tab. If you click on a tab with the right mouse button, you can assign the page a name, which then appears on the tab. This makes it easy to organize your worksheets by district, department, product line, or whatever,



and then move easily among them. Pretty good so far, eh?

It gets better. If you have a set of pages that are similarly structured—for example, the budgets for different departments—you can designate them a group, then format and manipulate them en masse. As with *1-2-3,* you can build true 3-D formulas, let's say to sum the values in the same cells in a group of department budget sheets. You can then set up multiple groups and assign them names, perhaps to organize the budgets for several district offices. Then, when you invoke a group editing mode, changes you make to one page in a group affect all other pages of the group. The notebook tabs, combined with the <Shift> and <Ctrl> keys and the mouse, provide intuitive procedures for navigating pages and groups.

QPW offers wide flexibility in displaying notebook pages: You can create multiple windows, and, as in *1-2-3,* split each window into horizontal or vertical panes. Then select any notebook page to appear in any of the resulting panes.

How Does It Feel?

Borland is bent on transforming the on-screen landscape of its *Windows* programs into dynamic "objects"—ranges, column headings, title bars, and so on—that users can manipulate directly with the mouse, instead of via traditional menus. Together with command shortcuts like tool bars, this arrangement generally makes programs easier to use. This design philosophy has also found its way into two Microsoft products—*Excel 4.0* and *Word for Windows 2.0;* in *QPW,* it appears as a scheme Borland calls "property inspection."

Here's how it works: Point to an object—for example, a column heading—and click the right mouse button. Up pops a dialog box that lets you inspect and change the properties of the column: its numeric format, font, text alignment, column height, and so on. Right-click on a notebook page tab, and you can select options for the current page—for example, page name, protection status, default column width, grid lines, and frame options. Right-click on a graph, and you can change the properties of the graph, and so on. Property inspection is a good idea because it provides a simple (and safe) way to explore the whole screen environment.

Excel 4.0 introduced the technique of "drag and drop" to the spreadsheet arena; now no product in the category would dare be without it. To move a range in *QPW,* you can simply select it, then drag it to a new location with the mouse pointer. Press the <Ctrl> key as you drag, and you get a copy of the range. But be aware that the same caveat applies here as in *Excel:* In all spreadsheet programs, moving worksheet cells changes the underlying structure of the worksheet, and when you move the cells that a formula refers to, you change the structure of the formula itself. The drag-and-drop capability makes moving cells so effortless that a naive or careless user could produce dangerous errors without even noticing.

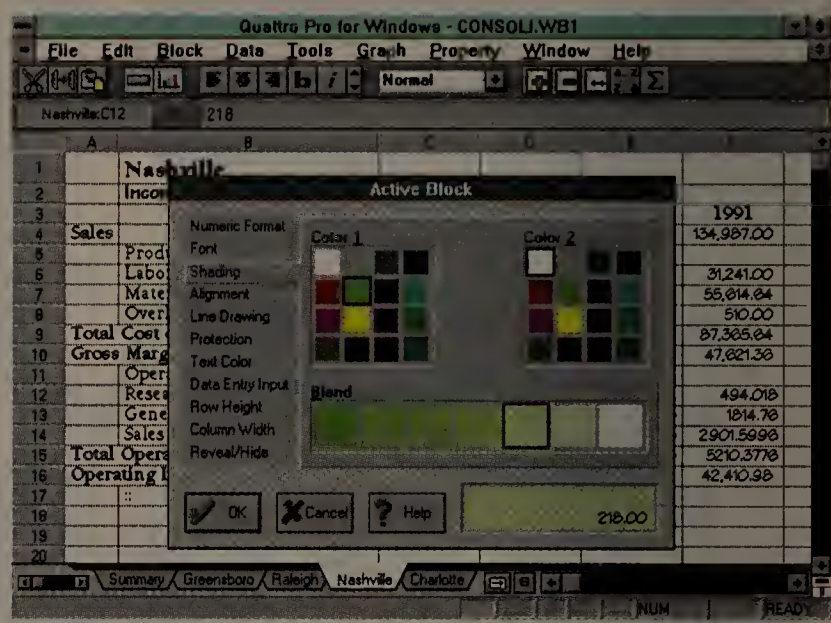
As the number of options available in programs proliferates,

DAVID SUTER

it's easy to lose track of where a needed menu command is located. To help remedy the situation, *QPW* provides compound dialog boxes and a dynamic tool bar. A compound dialog box has a mini-menu along its left edge; click an item, and you see the options for that item on the right. The dynamic tool bar displays different tools depending upon the current operation: For example, when you edit a formula, the tool bar displays options for pasting @functions and macro commands into it.

If you routinely manipulate reams of data, QPW's approach is a breath of fresh air.

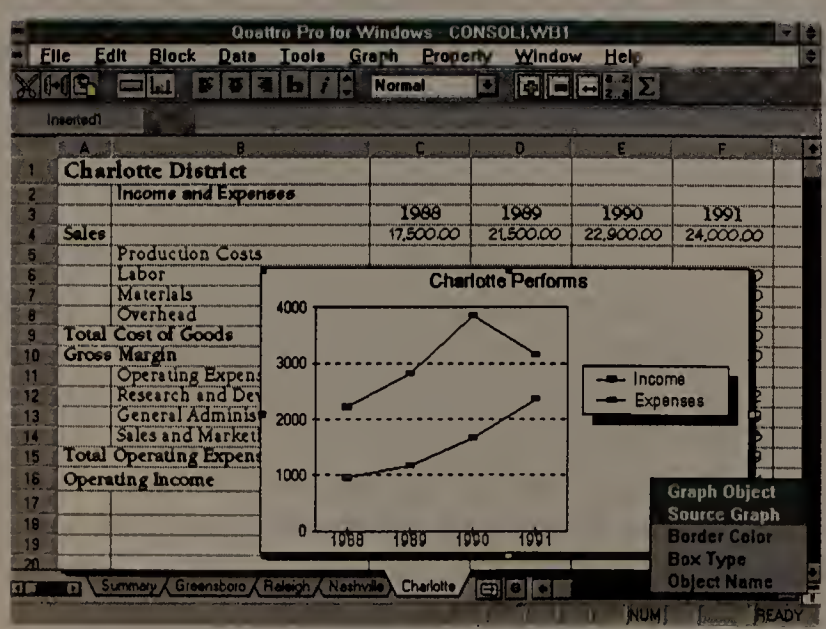
QPW's interface, with its distinctive notebook pages, property inspection, compound dialog boxes, and dynamic tool bars, is full of good ideas, but their execution is often incomplete. For example, while you can drag and drop a range of two cells or more, you can't drag one cell. And sometimes when you click the right mouse button, you can't find the options you need. For instance, when you select a block of cells and right-click, it would be nice to be able to name the block; when you right-click a graph object on the worksheet, you can change its border features, but not its background color.



Compound dialog boxes help organize Quattro Pro's many options. When you select an item from the list on the left side of the box, the options change. Here you see the shading options for a selected block of cells.

How Does It Show Off?

The DOS version of *Quattro Pro* (*QPD*) is justly renowned for its fancy graphics; *QPW* will not disappoint either. In fact, most *QPW* users may decide they don't need a dedicated presentation graphics program. There's a full range of graph types, including rotatable 3-D graphs, and you can plot as many data series as you wish. For editing graphs, you get a full array of drawing tools (but no curves); layering commands; a snappable, scalable grid; commands to align objects; color palettes; and more. You can import bit maps and other graphics formats and even attach a bit map as "wallpaper" to the surfaces of a 3-D graph.



Quattro Pro for Windows' 3-D worksheets are organized in notebooks, complete with nameable tabs. In this case, data from each district office is on a separate page. Click the right mouse button on a graph, and a pop-up menu (bottom right) lets you change the graph's properties.

As you create graph objects, they automatically appear as icons on a special "last page" of the notebook. When you select the graph page, all of your graphs are there: You can name them, rearrange them, or drag and drop them to create a slide show complete with a light table that lets you see miniatures of the images that will appear in your show and rearrange them by dragging them with the mouse. There are fancy transition effects and hot buttons to execute macros or branch to other slides. This is hot stuff!

When it comes to reports, *QPW* is the first spreadsheet to provide adequate control of header and footer spacing. It offers an excellent print preview, with easy access to printer and page setup dialog boxes, mouseable margins, and a nifty gray-scale button that lets you change colors into the shades of gray that will appear on your black-and-white printer. Named reports let you organize multiple reports within the same notebook.

How Does It Get Along?

QPW can open a wide variety of file types, including all releases of *1-2-3*, *Paradox*, *dBASE*, and *Excel 3.0* (but not *Excel 4.0*). It reads and obeys *1-2-3*'s Wysiwyg format files. If you press the slash key, you get a Classic *1-2-3* menu, so *1-2-3* users can whip right through their regular finger exercises with aplomb. But whereas *Excel 4.0*'s interpreter coaches you on how to transfer your *1-2-3* skills into *Excel*, *QPW* doesn't show you where to find the equivalent *Quattro* commands.

If you've got a heavy investment in *1-2-3* or *QPD* macros, test *QPW* carefully for compatibility. The macro language inherited from *QPD* has changed to reflect the new menu organization of *QPW*. You should be able to run *QPD* macros in *QPW*, though I had problems with some range names and key-

equivalent commands in the beta release. If your *QPD* macros use keystroke commands, you'll have to switch to the *QPD* slash menu interpreter. Borland claims *QPW* will run macros written for *1-2-3 2.01*, but my beta copy was uncooperative.

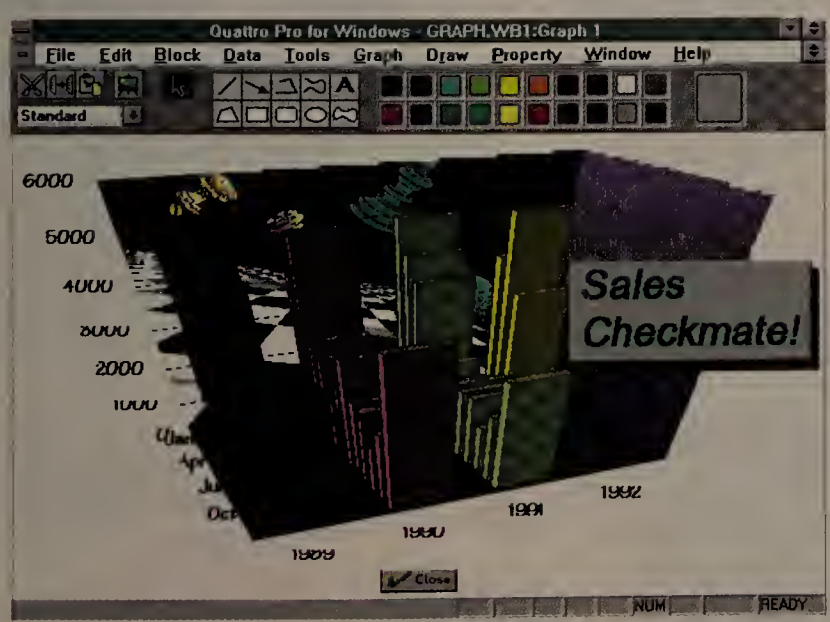
Speaking of macros, if you want to build custom spreadsheet applications, you'll appreciate *QPW*'s dialog builder. Like the notebook metaphor, this dialog box editor is a radical simplification of a formerly complex procedure. It's not a separate program as in *Excel;* indeed, I'm told that much of *QPW* itself was constructed with this tool.

When you enter the dialog builder, you see an empty dialog box. From the toolbox, you select radio buttons, text fields, sliders, file browsers, and other components. You can even import a custom bit map to display on a button. Then you link each component to a macro or other spreadsheet action. For example, you might arrange to have *QPW* enter the corresponding numeric value in a cell whenever the user positions a slider with the mouse. As you build your application, you name your dialog boxes, and they automatically appear as icons, along with your graphs, on the last page of the notebook.

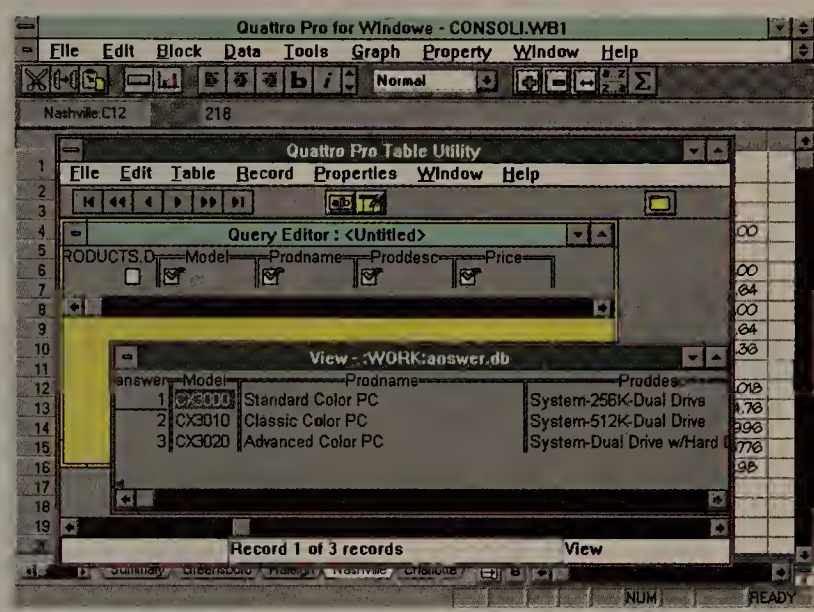
How Does It Communicate?

Imagine that you work for a printing company. You manage your company's work orders and invoices with a custom *dBASE* network application. You enter a company name into a cell in your *QPW* spreadsheet, and the current status of all jobs for that client appears in an output range on your screen. Simultaneously, an operator out on the shop floor keys in a notation that a job for that client has finished, and the information on your worksheet immediately reflects the change.

Borland intends to make this kind of data base and spreadsheet interaction commonplace. *QPW*'s Database Desktop command invokes a program (it's a DLL) that's identical to the desktop manager in Borland's imminent *Paradox for Windows*. With it you can open *Paradox, dBASE,* or SQL tables,



QPW continues the graphics tradition that made the DOS version famous. This rotated 3-D graph has a bit-map image pasted to its rear wall.



The Database Desktop lets you browse, edit, and select data from external data base files, then copy or link the selected records to your spreadsheet. QPW shares this program with Borland's forthcoming Paradox for Windows.

append or edit records, execute queries, and paste the results into your worksheets. By pasting DDE links, you can establish live two-way connections between your spreadsheet and a remote data base, making the kind of application described above really simple.

How Does It Measure Up?

We'll put the shipping version of *QPW* through its paces against the competition in a future issue. In the meantime, it's safe to say that its organizational talents, presentation flair, and data base integration skills provide the foundation of a truly world-class program.

As a reminder, my beta of *QPW* lacked some *Excel 4.0* features. Where are Wizard help, spelling checks, drag-and-drop tool bar customization, outlining, automatic label-based consolidation, named views, and a scenario manager? Also missing, but promised for the shipping version, were autofill, automatic formatting, cross-tab reports, and advanced math and statistical functions. But organizations should make long-term software buying decisions based on a program's fundamental structure, not on today's feature list. In this competitive market, few really nifty features remain unique for long. Besides, the new *Quattro Pro 4.0* is incontrovertible proof of Borland's skill in developing great programs. Borland's first *Windows* entry is a good one; smart money says its next one will be great.

Richard Scoville is a contributing editor for PC World *and a software training consultant in Durham, North Carolina. He can be reached on PC World Online (see page 8 for more information).*

WHERE TO BUY

Quattro Pro for Windows 1.0
Borland Int'l Inc.
1800 Green Hills Rd.
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S/2

A Better DOS Than DOS?

Elephants *can* tap-dance! Here's how the surprisingly nimble OS/2 2.0 measures up to DOS 5.0 on the command line.

Maybe you've heard that IBM's OS/2 2.0 gives *Windows* a run for its money. Well, maybe it does (see "OS/2 2.0 Challenges Windows 3.1" in last month's issue). But what about those of us who continue to toil away at the DOS prompt, typing commands, writing batch files, and otherwise eschewing the dubious joys of dragging, dropping, double-clicking, and mousing around?

What can we expect from OS/2 2.0? How much is there to learn? Does it make any sense to drive the biggest, costliest PC operating system yet developed from the command prompt? Will our DOS batch files run under OS/2? And maybe most important, will OS/2 2.0 run our DOS-based applications?

Based on informal tests, the answer

BY VAN WOLVERTON

DAVID FLAHERTY

Help Is a Four-Letter Word

Back in the bad old days of software, there was the manual—hard to read, poorly organized, and sometimes inaccurate. Documentation has improved, but there's still way too much of it for a mere mortal to wade through. Fortunately, we also have on-line help to navigate the software waters. One bit of advice, though: If you're using DOS or OS/2 2.0, don't throw away those manuals just yet.

Short, Not Sweet

DOS hasn't won many friends with its often arcane messages. Type DOR instead of DIR, for example, and DOS counters with 'Bad command or file name' and waits for you to figure out what you did wrong.

Make the same mistake with OS/2, though, and you get a complete sentence with its own identification number: 'SYS1041: The name specified is not recognized as an internal or external command, operable program or batch file'.

Type HELP SYS1041, and you get the following:

'SYS1041: The name specified is not recognized as an internal or external command, operable program or batch file.
EXPLANATION: The name specified should be one of the following:
1. The name of an OS/2 internal command.
2. The name of an OS/2 external command.
3. The name of an executable program whose file extension is .EXE or .COM.
4. The name of a batch file whose file extension is .CMD.
For cases 2, 3 and 4 (if a path for the command was not specified at the command prompt), the file must reside in the current directory or in one of the directories specified by the PATH environment variable.
ACTION: Retry the command using a correct name or PATH.'

What have we really gained here? We've moved from terse and cryptic to verbose and murky. Have we improved communication? I'm not sure.

The Object of My Affection Is Hypertext

Like *Windows*, OS/2 includes cross-references in its help messages; if a term is displayed in a different color, more information about it is available. After one warning that I was in danger of overwriting something described as a 'program-file object', I decided to double-click my way to comprehension. OS/2 response: 'An object that starts a program. *(continues)*

to this last question is an emphatic yes. OS/2 2.0 seems remarkably tolerant of the wonderfully bewildering array of software in the PC world. *Generic CADD*, for example, is a demanding program—"ill behaved" enough (in Microsoft's words) to prevent the DOS 5.0 Shell from being able to task switch it. OS/2 takes *Generic CADD* in stride. Not only can you task switch it, but you can run at least four separate full-screen sessions of *Generic CADD* simultaneously, each with its own drawing, and switch between them quite nicely. And you never even have to buy or install DOS. That's impressive.

Some terminate-and-stay-resident programs (TSRs) written for DOS systems are notoriously finicky, refusing to work properly or even stopping the entire system if they don't like certain hardware or software. OS/2 runs TSRs in a DOS session (even if you start them at an OS/2 command prompt) and seems to accommodate them well. It handled several with no problems, including *HiJaak*, a screen-capture program more high-strung than most TSRs.

That Old Familiar Feeling

For those weaned on the DOS command line, there's more good news than bad. Working at the OS/2 prompt feels pretty much like working at the DOS prompt. For the most part, you can type the same commands and get the same results. But even the staunchest command-prompt fans can't completely escape OS/2's graphical user interface, which comes up when you launch the program. All session management—those multitasking features that are OS/2's main strength—happens on the desktop. You can, however, leave the desktop for the command prompt in an OS/2 or DOS session as soon as the system is running.

You can start as many OS/2 or DOS sessions as you like, switching between them at will. Unlike the DOS Shell, which does simple task switching, OS/2 offers full multitasking: You can leave a program running when you switch away from it. OS/2 and DOS sessions can run either in a window or as full screens.

All your batch files should work without a hitch in a DOS session, even if they include ANSI.SYS commands and some of those nasty little assembly language programs that mess with the keyboard or display. You can run all these batch files at an OS/2 command prompt too, because when you run any batch file with the extension BAT, OS/2 starts a DOS session.

An OS/2 batch file's extension is CMD, not BAT. Because the OS/2 command set includes virtually all the DOS commands with no changes, you can convert most DOS batch files to OS/2 batch files simply by changing the file's extension to CMD. However, this conversion won't work on a DOS batch file that includes assembly language programs, such as one that waits for a key to be pressed and returns an identifying number. OS/2 will display an error message, 'SYS1059: The system cannot execute the specified program', and refuse to continue with the batch file.

More Information On Line

The news about on-line information is equally good. Despite some arcane terminology (see "Help Is a Four-Letter Word"), the on-line information guides

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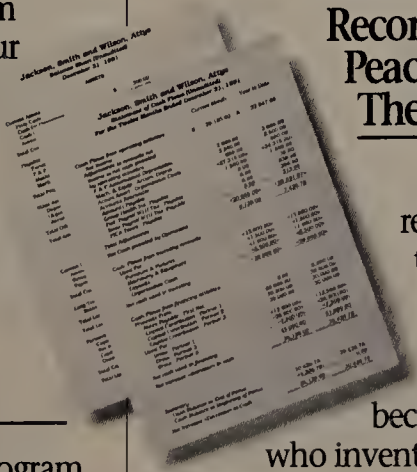

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Help *continued*

Program files commonly have extensions of .EXE, .COM, .CMD, or .BAT. Contrast with data-file object'.

Now I'm really confused. What on earth is an object? Is a program-file object a file or isn't it? I double-click on *data-file object*, hoping its definition might shed some light: 'An object that represents a file in the file system. The primary purpose is to convey information, such as text, graphics, audio, or video. A letter or spreadsheet is an example of data-file objects. Contrast with program-file object'.

This thread has led me full circle, and I'm still not sure what I'm being warned about. I turn to the on-line help index and find 'program object' (not to be confused with *program-file object*, which we saw earlier). Double-clicking *program object* yields this definition: 'An object representing the file that starts a program. You can change the settings for this object to specify how you want the program to start or where the files related to the program are stored. For example, you can specify that an editor always starts with the NOTABS option'.

Ah. A program-file object is an object that starts a program, while a program file is an object representing the file that starts a program. Of course.

On-Line Help Comes Through

In general, though, OS/2's on-line command reference works well (OS/2 2.0 doesn't come with a command reference manual; you've got to buy it for $35.75 plus tax). I learned the on-line system's value when I was trying to make OS/2 respond to ANSI.SYS commands in some batch files. In frustration, I typed HELP ANSI. Bingo! In a few seconds, OS/2 displayed a description of the OS/2 ANSI command, which lets you turn extended console control on and off from the keyboard instead of changing CONFIG.SYS and rebooting—a big plus.

That took care of OS/2; what about DOS? I double-clicked on a cross-reference to the DEVICE command, and there were instructions to put DEVICE=C:\OS2\MDOS\ANSI.SYS in CONFIG.SYS to enable extended console control for DOS sessions. I did, and ANSI.SYS worked like a charm.

So if it isn't all beer and skittles, it isn't all gall and wormwood, either. Much of the terminology seems to have been written to satisfy some corporate version of rectitude with little apparent regard for mere computer users. But once you get past the conceptual hurdles and start driving the system, on-line help is fast, refreshingly complete, and much more convenient than a manual.

you through learning sessions well enough that there's little need to refer to printed documentation.

IBM put a lot of thought into the messages OS/2 displays, which are much more specific and useful than their DOS equivalents. For example, we've all run headfirst into what may be the most criticized message in computerdom:

'Not ready reading drive A
Abort, Retry, Fail?'

You probably forgot to close the floppy drive's door before you issued the DIR command, but DOS offers no clue as to how to correct the problem. Make the same mistake with OS/2, and it clears the screen before responding:

'SYS0039: The A: device is not ready
Return error code to program
End program/command/operation
Retry command or operation
Display help'

If you choose *Display help* from the menu, OS/2 clears the screen again, this time nearly filling it with information, some of which is reproduced below:

'EXPLANATION:
One of the following has occurred:
1. The device is not ready because either the drive is empty, the drive door is open, or the drive is in use.
2. The device driver for COMx is not installed or COMx was shut down, and further use of COMx is disabled.
ACTION:
1. a. Insert a disk in the drive.
   b. Close the drive door.
   c. Wait until the drive is available.
2. a. Check the CONFIG.SYS file to be sure there is a DEVICE= statement for COMx.
   b. Shut down the system.'

Definitely more helpful.

When you consider how well it runs an impressive array of disorderly software, you have to admit OS/2 does quite well.

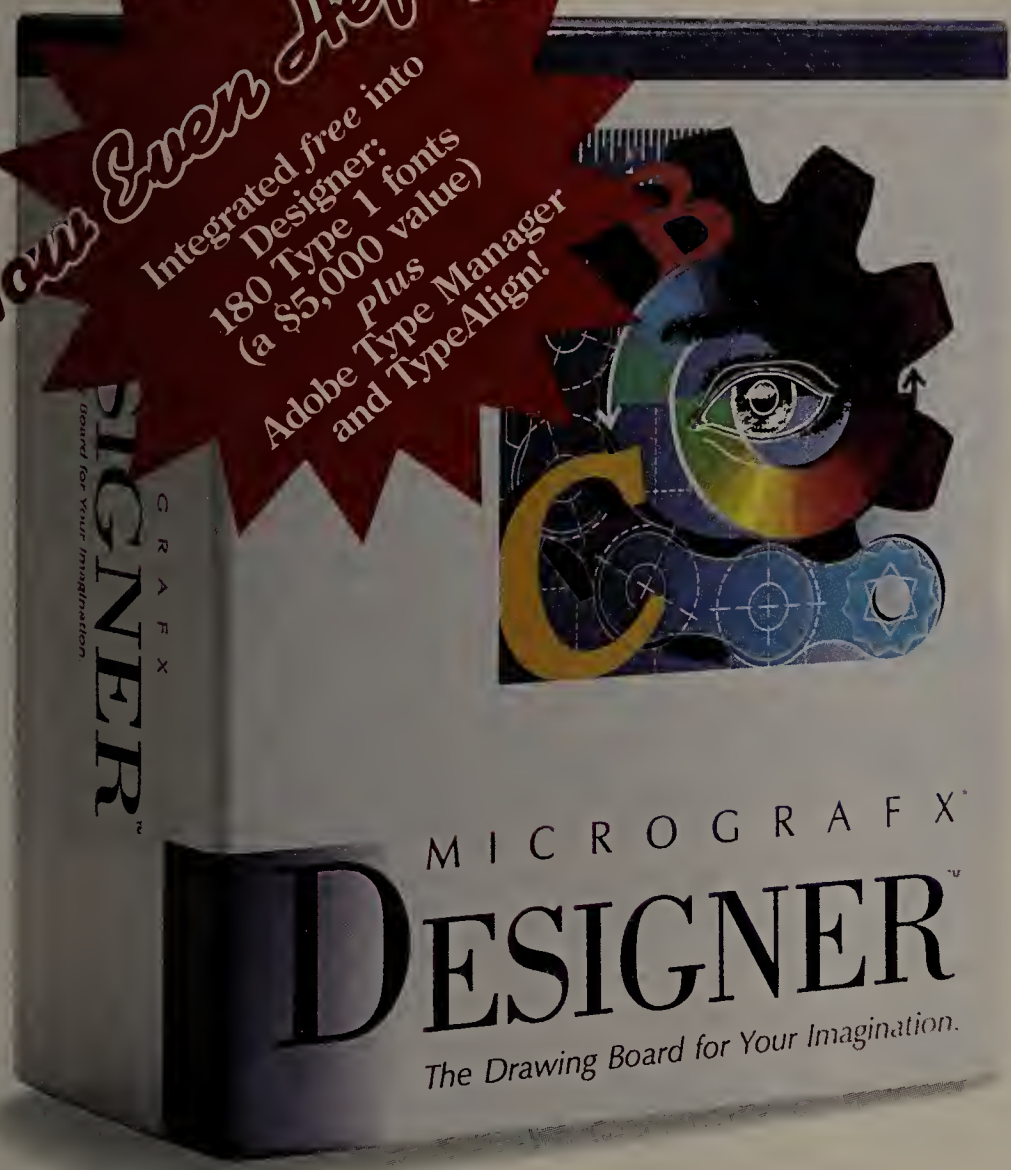
The command reference is equally useful. From the command line, just type **HELP** followed by the command name; if you don't know the command name, type **HELP CONTENTS** and select *OS/2 Commands by Name*, or choose *Index* at the bottom to scroll through the entire list of on-line help topics.

This Is Not Your Father's PC-DOS

The bad news is that after you've installed OS/2, your PC feels a lot less like a *personal* computer. The sheer size of OS/2 2.0 is unnerving: It comes on 21 disks, resulting in nearly 300 files in 45 directories (15 of which, oddly, contain no files). The toll in disk space runs to about 30MB. The entire installation process, in fact, might make you wonder whether you know enough about your PC to do the job properly (see "Installation: Don't Try This at Home" for the story of one user's trial by installation).

Be prepared for a shock the first time you look at CONFIG.SYS after you install OS/2 2.0: You'll find 63 commands, most of which look vaguely familiar at best. You're probably comfortable with most of the commands in CONFIG.SYS on your DOS system. But

HEFTY HEFTY HEFTY



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Clip art images	Over 1,700	750
Type 1 fonts	180	0
PageMaker 4.0 filter	Yes	No
On line help screens	Yes	No
24-hour support	Yes	No

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Circle 179 on reader service card

Installation: Don't Try This at Home

OS/2 2.0 grabs your attention right up front. Twenty-one (21!) 1.44MB disks. Six manuals, albeit slim ones (and not a three-ring binder in sight). Plus a 6-page quick reference and assorted program license agreements (in six languages), a license description, registration and change-of-address cards, and ads for OS/2-related products.

Remember version 1 of DOS? A lone 160K 5¼-inch disk, a DOS manual, and a BASIC manual. Nothing to install because there was no hard disk; just copy the DOS disk, put the original in a safe place, and start the system with the copy in A:.

But version 1 of DOS did so little, it hardly counted as an operating system. Look how big DOS has grown, not to mention *Windows*. And they've grown harder to install, too.

Right. Let's keep an open mind about this.

Uh-Oh. Can't Use Drive B:

Installing a new operating system is sufficient motivation for me to read the documentation instead of grabbing disk 1, stuffing it in the system, and figuring everything will work out. Sure enough, an ominous statement early on in the 125-page OS/2 2.0 installation guide reads: "Are you installing from a disk drive other than the one currently assigned as drive A?"

Well, yes, I am. At least I plan to. My OS/2 2.0 disks are 3½ inches, corresponding to my Gateway 2000's B: drive. Further comments aren't reassuring:

"If you have a computer with multiple disk drives and you want to install OS/2 2.0 from a drive other than A, you must change the startup sequence of your computer to assign that drive as A. For example, if you wanted to install from drive B, you would make drive B the first drive in the startup sequence.

"Refer to your computer system documentation to find out if you can change the startup sequence of your computer."

Changing the start-up sequence of disk drives isn't exactly brain surgery—I'm pretty sure all you have to do is swap the cables from the controller—but I'm reluctant to jump in without some reassurance. Soooooooo, I call Gateway 2000 technical support on Saturday afternoon, where I'm promptly put on hold. After an hour and 20 minutes of seventies soft rock, an operator tells me everyone is going home for the weekend and asks if I would like to leave a message. I would.

Then I quickly call a local entrepreneur (The Byte Shop in Lolo, Montana) that assembles and sells systems at prices about the same as those of mail-order houses like Gateway. Kevin answers on the second ring. "No problem," he says. "Just swap the cables on the drives and use SETUP to tell the system which drive is which." Elapsed time: 40 seconds.

Sure enough, if I'd swapped cables without talking to someone, I'd probably have forgotten about the setup program and not been able to use either drive. I peel the cover, follow Kevin's instructions, and reboot. Eureka! Drives A: and B: are swapped. Elapsed time from phone call to reboot: 20 minutes.

(In fairness, I must report that a Gateway 2000 technical support rep called with the answer to my question shortly after I'd finished the job, almost half an hour after he was supposed to have gone home.)

Now I decide I want a dual-boot system so I can run either DOS or OS/2. This means I give up the high-performance file system, but I can continue to use DOS as well as OS/2 until I'm sure I want to commit to the changeover. And I don't have to back up and restore the whole hard disk.

Uh-Oh. Hard Disk Is a Problem

The installation guide says you should have at least 40MB in the primary partition to install a dual-boot system—30MB for OS/2, 2MB or 3MB for DOS, and 4MB to 8MB for a swap file.

Hmm. Sounds like a problem. My hard disk is *(continues)*

of the 15 DEVICE commands in OS/2 2.0's CONFIG.SYS, only a few seem to refer to familiar devices. Another 16 SET commands—that's right, SET commands in CONFIG.SYS, not AUTOEXEC.BAT—define environment variables that are undoubtedly important, but most give little clue as to their meaning.

If CONFIG.SYS contains 16 SET commands, then the environment must be more crowded too, right? Right. Type **SET** and you'll see some real oddball commands. We've had to get used to application programs adding environment variables to our system; now the operating system is doing it, moving us a bit further from feeling in control.

At this level just below the command prompt, OS/2 2.0 lacks the comfortable feel of DOS. In fact, it feels something like a minicomputer or mainframe operating system for PCs. Not only are CONFIG.SYS and the environment filled with mysterious commands, you can't just turn off your system after you exit your programs; you must shut down OS/2 first. It isn't going to be as easy to do the routine maintenance required after you install a new program or device or try to boost system performance by fine-tuning the commands in CONFIG.SYS or AUTOEXEC.BAT.

Of course, *Windows* users have griped for years about the temperamental nature of WIN.INI, SYSTEM.INI, and the other operating parameters that require periodic attention. OS/2 2.0 is even tougher to maintain: You'll probably want a designated expert to perform all software system upkeep.

Perhaps that's to be expected given

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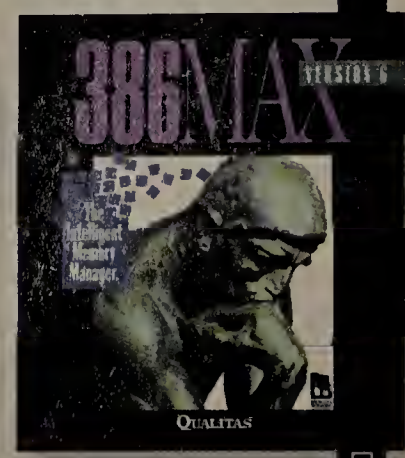

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Installation *continued*

divided into ten drives because I formatted it several years ago under DOS 3.3, which allows a maximum volume size of 32MB. So what now? I could try backing up, changing partition size, and reformatting. But that takes time, something in short supply right now; I'm in the middle of a major project with deadlines almost every day (and calves are being born unexpectedly, but that's another story). Besides, neither DOS nor *Windows* makes me jump through these hoops: Why should OS/2?

The installation guide holds out some hope that OS/2 2.0 will fit into less than 40MB if I omit some features during installation. Done. I decide to eliminate some games and documentation files.

After half a day of listening to music on hold, swapping disk drive assignments, reading manuals, and general stewing, I put the installation disk in my newly defined drive A: and press <Ctrl>-<Alt>-<Delete>.

The system reboots and comes up in the OS/2 installation program. Installation goes without a hitch. After some 45 minutes of swapping disks and choosing options, I finish installing OS/2 and migrating my DOS and *Windows* applications.

But OS/2 won't work properly. Whenever I try to run a DOS or *Windows* program, I get a curious error message that tells me a program tried to 'execute an instruction whose operation was not defined for the host machine architecture'. The host machine is a plain-vanilla 33-MHz 386. Most curious.

So began my IBM 800-number odyssey. After I described the problem for the third time, it took less than an hour for an OS/2 wizard in Boca Raton to come up with the suggestion that the problem was my super-VGA card (Orchid ProDesigner), which OS/2 2.0 didn't yet support. Unable to propose a quick software solution, IBM air-freighted me a PS/2 system with OS/2 installed and promised to ship me the next version of code, which would support the card, as soon as possible.

But installing the final version of OS/2 2.0 produced essentially the same result: I couldn't run DOS or *Windows* programs. IBM reported that Gateway's 33-MHz 486 was certified compatible but the 33-MHz 386 wasn't (and sure enough, the released version installed and ran just fine on my 486). IBM also said that super-VGA cards often cause problems and that mine wasn't on the compatibles list.

I then spoke with a development engineer at Gateway 2000 who told me that old machines like my 386 have little chance of running OS/2 2.0 because of BIOS incompatibilities on both the motherboard and the disk controller. The machine is two-and-a-half years old, and he spoke as if it were built sometime during the Pleistocene! Conclusion: Not only do you need a fast machine with lots of memory and disk capacity, but it better be fairly new, too.

My PC is two-and-a-half years old, yet the engineer I talked to spoke as if it were built sometime during the Pleistocene!

Who Put the P in PC?

Installing OS/2 2.0 is no job for the casual user. For starters, many (if not most) users will have to swap drive assignments —an immediate obstacle. Next, the process of choosing the type of installation (OS/2 only, dual-boot with DOS, or a multiple-operating-system installation that accommodates OS/2, DOS, UNIX, and so on) requires a depth of understanding of hardware and software that many users simply don't have or want. The installer better be comfortable with terms like *partition* and *volume* and know the consequences of deleting partitions and reformatting.

It's ironic. IBM validated the term *personal computer* in 1981, putting significant computing power in the hands of average users. Just a little more than a decade later, they're trying to take it away.

the complexity, size, and sheer power of this program. When you consider how well it runs an impressive array of disorderly software, you have to admit that OS/2 does quite well. It doesn't handle the equally bewildering range of hardware as successfully, but that's understandable. It supports most of the machines that have the power and storage capacity to run it, but it can't handle some of the early ones. Version 2.1 will probably do better.

That's not to suggest you should wait. If you've got the hardware and the stomach to handle a few small idiosyncrasies—and the even greater intimidations of installation—you'll find that OS/2 2.0 is a remarkable achievement. For those who drive DOS from the command prompt because they don't want to plow through layers of menus and limit themselves to a mouse-centric landscape, OS/2 2.0 just may offer the best of both worlds: a command prompt with much more powerful tools than DOS offers, and a desktop that lets you add even more capability without having to spend much time using it.

Van Wolverton is a freelance writer and the author of Running MS-DOS, Fifth Edition *(Microsoft Press, Redmond, Washington, 1991).*

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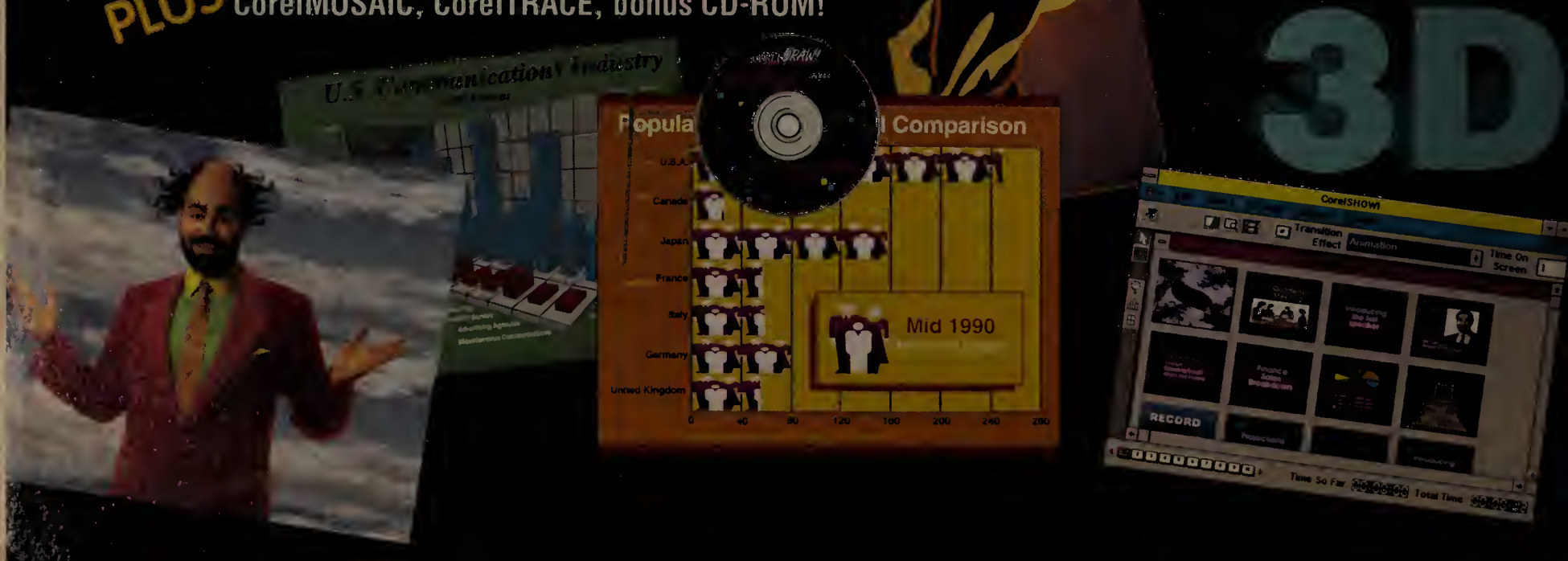

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FORECASTING

The Manager's Crystal Ball

CAN A MERE MORTAL PERFORM THE BLACK ART OF FORECASTING? WE LOOK AT SEVERAL PACKAGES THAT CAN HELP YOU SEE INTO THE FUTURE OF YOUR BUSINESS.

BY PETER D. VARHOL

Ever wish you had a crystal ball to predict product sales, anticipate expenses, or foresee the number of customer inquiries? You're not alone. At one time or another all business professionals have to make forecasts—usually dependent on the less-than-reliable combination of intuition, experience, and spreadsheets.

Fortunately, several software vendors have developed specialized forecasting packages for nonexperts. This software helps you produce much more reliable forecasts than those you make by judgment call or spreadsheet alone. And you can use the data already sitting in your spreadsheet.

LIFE BEYOND THE SPREADSHEET

I looked at four forecasting packages, all priced below $700: *Forecast Pro for Windows, SmartForecasts II, Autocast II,* and *4Cast/2.* Each package automatically selects appropriate forecasting methods and imports data from different sources. My goal was to determine if the once-a-month forecaster—a spreadsheet user by trade—can actually make reasonable forecasts using spreadsheet data.

On my 40-MHz 386 I tested the packages' performance on four tasks—importing spreadsheet data, forecasting trending data and seasonal data, and producing graphs and reports. I used the automatic forecasting features for all analyses because it's easier for nonexperts than trying to select a forecasting method. To test for accuracy, I checked the forecasts rendered against actual after-the-fact data.

TASK 1: MOVING YOUR DATA

While all these programs accepted data in a variety of spreadsheet formats, I had to restructure my spreadsheet to conform to their input requirements. Once the information was in the right format, every package imported data quickly, taking under 5 seconds to import 100 data points.

SmartForecasts II accepts a wide variety of spreadsheet formats, with one condition—you have to specify whether the data item should be read in a row or in a column and in what cell it should start. Otherwise, it would automatically import the whole spreadsheet, minus the text. To preserve descriptions of the data, I used one of *SmartForecasts'* predefined formats. I didn't have to prepare a special spreadsheet, or copy a subset of data from my existing spreadsheet to import data. Data import grade: B+

4Cast/2 required me to completely specify the spreadsheet format. I had to tell it exactly which rows and columns to import. However, I found a nice feature in this package: After importing the spreadsheet, it displayed the data and asked if it was in the format I intended. If not, I had the option of going back and respecifying the data parameters. Data import grade: B+

Forecast Pro for Windows offered a wide range of preset and customizable spreadsheet input formats. I could either put a single time series in row or column format or define my own format, but I had to specify the range within the spreadsheet before I could import. It provided a dialog box for selecting the different file formats to be imported. Data import grade: B

In *Autocast II,* I had to use either raw data files with no descriptive text, or files containing a description of the data, periods per year, with beginning data in the first three rows of the spreadsheet. Once the data was in this format, *Autocast II* read as many data lists as I defined in the spreadsheet. With these format limitations, it was more useful to make a copy of the subrange of numerical data from within my spreadsheet, place it in a temporary file, and then perform the forecasting operations

GRACE KNOTT

on the temporary file. Data import grade: C

TASK 2: FORECASTING TRENDS

A trend measures the increase or decrease of performance. Sometimes you can see a trend when you look at a plot of the data, but other times a trend can be hidden by seasonal fluctuations or other factors. I chose to look at the trend in median family income in the United States. I had actual data on median family income from 1982 to 1991, and I wanted to accomplish two things: Find a forecast that best fit the actual data for the period 1982 to 1991 and use that forecast to predict median family income through the end of the decade.

Since the second part of this task deals with events that have not yet occurred, the packages' reliability was rated by how closely they fit the actual data for 1982 to 1991. This was calculated automatically by all the packages. For example, a package would generate values for 1982 to 1989 and compare the generated values to actual past values, then average the differences between the two; the smaller the difference, the more accurate the forecasting method.

Each package automatically picked one of three techniques for forecasting median income—*Box-Jenkins, exponential smoothing,* and *moving average* (see "A Forecaster's Glossary"). *Forecast Pro,* using the Box-Jenkins technique, returned the most accurate results, showing the smallest difference between forecast and actual values. Visually, the forecast appears as an extension of the actual data. However, this model took the longest to calculate—about 20 seconds. This is not surprising, because the Box-Jenkins is an iterative technique that runs the analysis up to 100 times to determine the best forecast. Trend data grade: A-

4Cast/2 and *Autocast II* both used the exponential smoothing technique, but set up the problem differently, with different results. *Autocast II* provided more accurate results and returned them almost immediately. However, when run in automatic mode, *Autocast II* didn't tell me what technique it chose. Trend data grade: B

4Cast/2's approach resulted in an acceptable forecast, but one slightly less accurate than *Autocast II*'s. Furthermore, it took over 12 seconds to return its results, an amount comparable to that required by *SmartForecasts II.* Trend data grade: B-

```
File: FCO.WK1                    Data: Original
Desc: G3..G128
Seas: 1        #Obs: 118      Fit: 1 - 118        Fcst: 119 - 130
MODEL-FITTING SUMMARY                                  Runtime: 00:00

Model: Automatic (min. MAD, 0.001 change)
Level: 1.000  Trend: 1.000  Phi: 1.000

                                        Your Model          Naive 1
Mean absolute % error   (MAPE)             0.1056%            0.2094%
Mean error                                 0.1835            64.5128
Mean absolute error     (MAD)             37.8413            82.5641
Root Mean squared-error (RMSE)           246.9261            94.2882

Fit coefficient                            0.5417

Number of outliers                              2
Autocorrelation -- lag 1 errors           -0.4964*
Regression      -- slope                   0.9861*
                -- intercept             557.839

                F9 - Menu      F10 - Continue
```

Autocast II produces a summary table that includes an analysis of the actual data as well as several different measures of forecasting errors.

FORECASTING TOOLS FOR 1-2-3

If you're handy with *1-2-3* but you're statistically unsophisticated and unwilling to tackle a separate stand-alone program for forecasting, you might try your hand at one of these forecasting utilities.

I used four of the leading forecasting utilities for *1-2-3* to predict the cost of a one-night stay in a California hospital during the years 1990 through 1994, based on 1980 to 1989 data. I used author Varhol's criteria for stand-alone programs: automatic selection of forecast methods, accuracy of predictions, access to advanced controls for sophisticated users, and clear presentation.

Tomorrow. This add-in for release 2.*x* was by far the simplest to use. It completely automated the process and shielded me from any jargon. I gave it a range of values, indicated a range to hold the forecast values, and the forecast was done for me. Its results were consistent with the other utilities, and its reported accuracy was high. *Tomorrow* fell down when it came to explanation: It offered a single statistic to tell me how well its model fit, and didn't tell me which method it used. I couldn't select a method myself or change the parameters. To see a graph of the results, I had to set it up myself. Although *Tomorrow* is "easy," it requires such a leap of faith that I wouldn't recommend it for the serious forecaster.

ForeCalc. This add-in for release 2.*x* and 3.*x* was also easy to use. It automatically selected a method for the hospital cost data that yielded results comparable to the other programs: It informed me of the method it selected, generated confidence limits (informed me of the probability that any answers were wrong), and provided summary statistics. I could select a forecasting method and specify parameters. It also created a macro that set up a graph to display the results. *ForeCalc* is a serviceable tool for most *1-2-3* users who occasionally need to do some forecasting, despite somewhat unstable performance (the graph macro kept crashing, and it refused to accept my range selection for output values).

ForecastGFX. To use this macro-driven template for

SmartForecasts II used one of the simplest techniques available but produced the least accurate forecasts when I fed it data from 1982 to 1990 to forecast 1991 income. This produced generally unrealistic forecasts that did not accurately reflect the trend. In its new version, however, the program will offer the advanced Box-Jenkins technique, which will better evaluate trend data. Trend data grade: C-

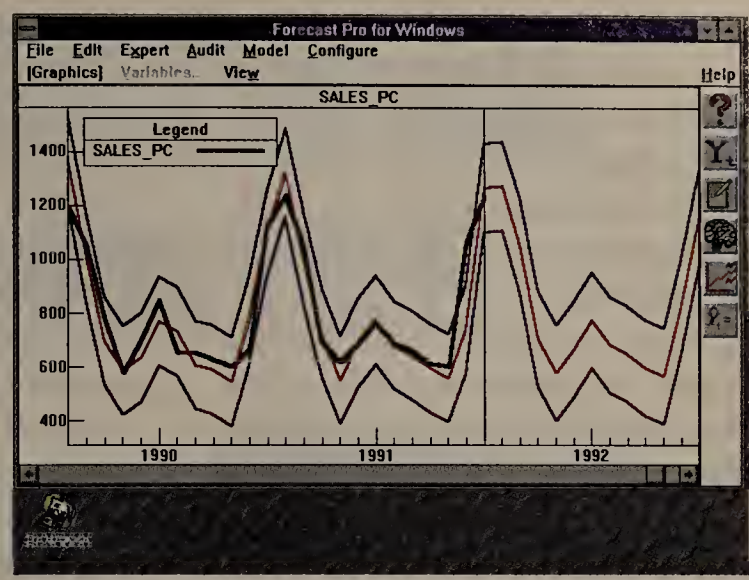
TASK 3: SEASONAL FORECASTING

Seasonality affects many forecasts. Because spring sales are traditionally heavier than in winter, for example, car dealers often begin a heavily advertised promotion on President's Day. For my seasonal forecast experiment, I looked at my monthly electric power usage for a ten-year period ending last year.

Both *Forecast Pro* and *SmartForecasts II* used a seasonal exponential smoothing technique that adjusted for a complex seasonality pattern; as a result, they were the most accurate. *Forecast Pro* did a better job of estimating how much electricity I'd need at different times of the year and produced a slightly more accurate forecast model. Seasonal data grade: A

SmartForecasts II had the speed, returning results twice as fast as *Forecast Pro,* and its forecast was only slightly less accurate than that of the *Windows* package. Seasonal data grade: A-

Surprisingly, both *4Cast/2* and *Autocast II* used the simplest type of exponential smoothing technique, which didn't reflect the seasonal nature of the data at all. Seasonal data grade: D



User-friendly Forecast Pro for Windows combines the ease of use and powerful graphing capabilities of a Windows application with sophisticated techniques for predicting accurate forecasts.

TASK 4: REPORTS AND GRAPHS

Of course, a forecast is no good unless it can be communicated to others in reports and graphs. The DOS packages produced adequate, no-frills reports and graphs, but *Forecast Pro,* the *Windows* entry, won easily in this area. It offers all the graphical support and cut-and-paste capabilities of *Windows* applications. Graphs are colorful and easy to understand in a way that no DOS package can match and can be customized to plot anything from basic data concepts to complex forecasts. *Forecast Pro* keeps the results of all analyses in an audit trail, which is available for inspection during a session and can be saved for future use. Reports and graphs grade: A

Autocast II uses high-resolution graphics drivers resulting in attractive

release 2.3 and 3.1, I needed to be familiar with forecasting methods and terminology to exploit its possibilities. But it provided great flexibility, with more methods available than any of the other programs. Thanks to *1-2-3*'s Wysiwyg interface, it also had the best graphical display of any of the utilities. I could key data into the *Forecast* template or import data from my own worksheets. Using this program was a trial-and-error process of choosing different methods and parameters and keeping track of the summary statistics. The manual, however, was exceptionally clear. I recommend *ForecastGFX* if you have release 3.1 and time to experiment: You'll learn a lot about forecasting, and you'll get good results.

Geneva Statistical Forecasting 1.0. This industrial-strength add-in for release 3.1 was awkward and slow, but it automatically selected its methods and performed forecasts on hundreds of data series at once. It also reported the best results of any of the utilities I tried, though the program is not easy to handle. For instance, the summary statistics are stored in a separate "parameters" file that interfered with my worksheet, and the parameters are poorly labeled. *Geneva* didn't accept range names to identify the data, and though it automatically set up a *1-2-3* graph, it chose the wrong range for the *x*-axis labels in my worksheet. Still, accuracy is what counts most in this game, and *Geneva* has the best score.

In case you were wondering, the cost of a California hospital bed is rising in a classic exponential curve: Expect to pay about $2900 per night in 1994. —*Richard Scoville*

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Isogon Corp.
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and colorful graphics under DOS. It provided a wide range of statistics and reports, but it output directly to the printer rather than saving a copy to disk for further editing. The forecasts, however, could be saved in a file. Reports and graphs grade: C

SmartForecasts II, which still uses jaggy CGA graphics, is the least graphically attractive and the least informative in terms of statistical analysis. It was the only package, however, that let me add labels and comments to the graphs before printing. I could make annotations and edit text on the graphs, resulting in a highly customized graphical output. Like *Autocast II,* it allowed me to save reports to disk in *1-2-3,* ASCII, or DIF format. Reports and graphs grade: C

4Cast/2 let me select high-resolution color graphics (although the default is black and white), but I could not find any way to print them. It produced good summary statistics, but printed only the forecasts, without statistics. The forecasts could be saved back into a spreadsheet. Reports and graphs grade: D

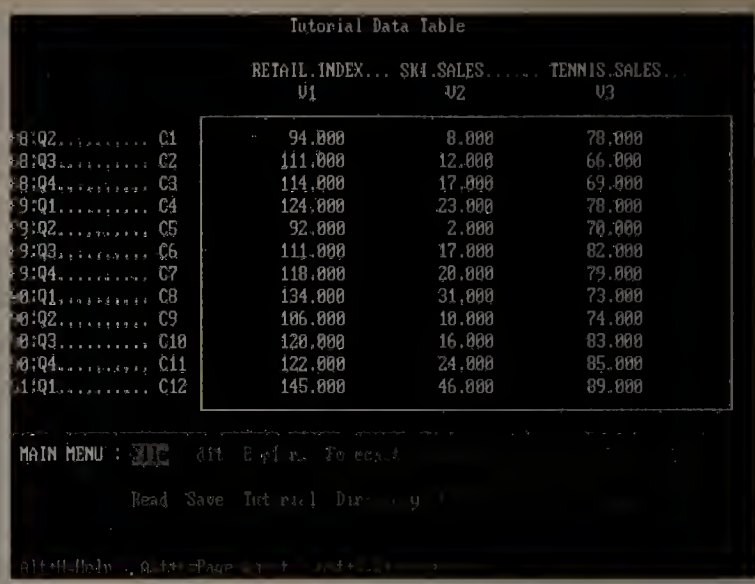
A TOOL FOR ALL SEASONS (AND TRENDS)

So, how do these packages stack up?

Forecast Pro for Windows achieves a good balance between automatic forecasting and user involvement. Its "expert system" describes important characteristics of the data and recommends an approach. However, it doesn't automatically implement that recommendation: It's up to the user to choose that approach. It produces the best forecasts overall and prepares the best reports. Overall grade: A-

SmartForecasts II's graphics and forecasting weaknesses are addressed in an upcoming release, which makes assigning an overall grade difficult. With its current 1980s graphics and user interfaces, it rates a C; with the enhancements soon to be available, it could easily move up to a B.

4Cast/2 is the most difficult package to use, with its complex data handling functions. Once mastered, however, data management is its strong suit. It per-



SmartForecasts II's new, improved version makes forecasting more straightforward, with the help of text-based menus and a more intuitive sequence of operations.

A FORECASTER'S GLOSSARY

Many nonstatisticians avoid forecasting because the techniques are highly technical and the terminology confusing. But with a few terms under your belt, you can begin to sound like an expert. All the packages discussed here will do automatic forecasting for you; most will tell you what kind of technique they chose, so you can learn as you go.

Time-series forecasting, the practice of using past data to predict future performance, is the foundation of forecasting. For example, based on the monthly car sales in prior months, I can predict how many cars I will sell in upcoming months. Car sales are seasonal: They follow predictable patterns based on the time of year. They may also follow a trend, with yearly sales either increasing or decreasing over time. Good time-series forecasting techniques identify and account for both seasonality and trends for predicting future performance. To do this kind of forecasting, you need both past data and an assurance that relevant business conditions will remain about the same.

There are three common techniques for time-series forecasting. The *moving average,* used in situations where you want a quick answer, is a rolling average of past data that is used as a prediction of future trends. Another model, *exponential smoothing,* compares actual and forecast values and includes an adjustable percentage of the error rate of past forecasts. There are a number of different exponential smoothing techniques (*Forecast Pro* includes nine), each of which offers better forecasts under certain conditions of trend, seasonality, randomness, or combinations of the three.

A third approach is the *Box-Jenkins* technique. This approach combines *auto-regression* (used to see a general trend rather than individual values) with the *moving average* model. Then it follows a three-step process to identify the forecasting model that best fits the data, fine-tunes the model, and then makes a forecast based on its analysis. This technique works best when data are not highly irregular.

Since different software packages choose different techniques for many of the same tasks, it's a good idea to select a package that explains which technique it's using and why, so you can eventually learn the most appropriate method for your particular task. —*Peter D. Varhol*

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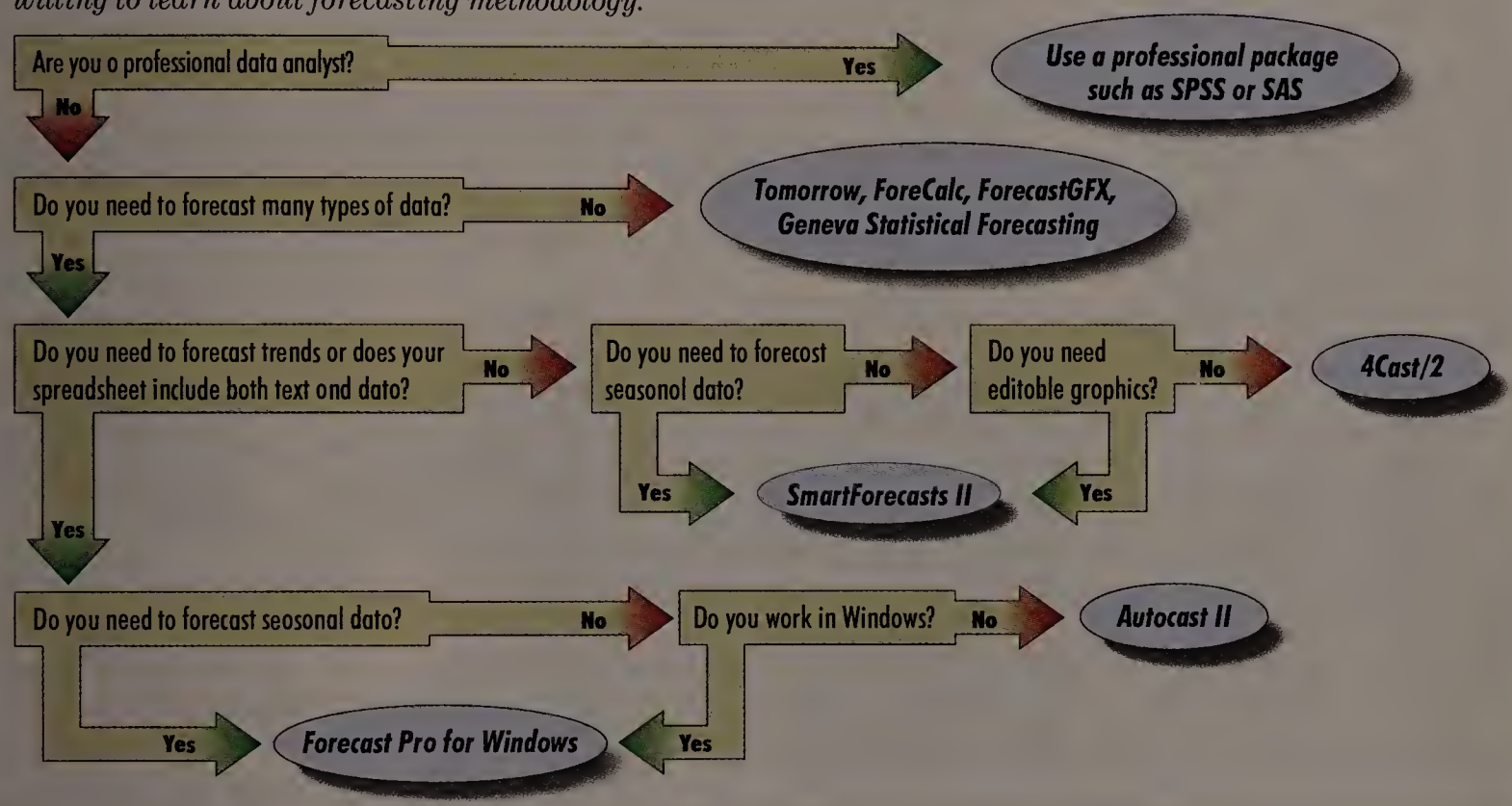
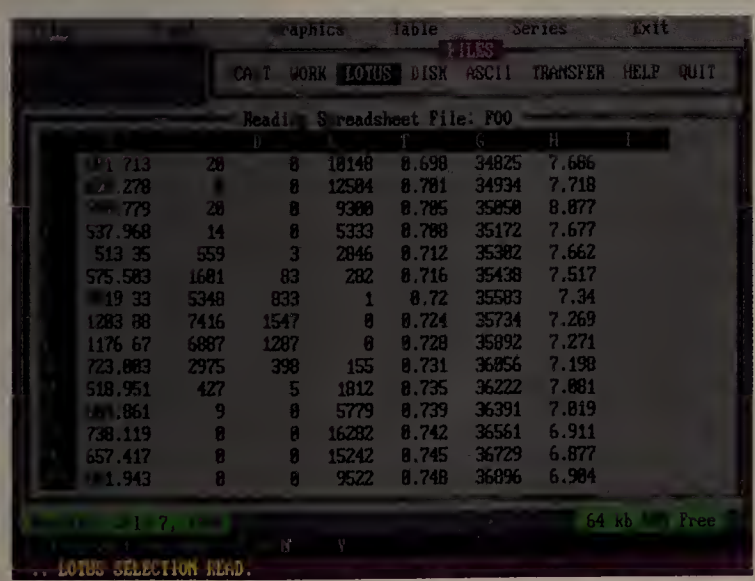
KNOW YOUR OPTIONS

Which Forecasting Tool Is Right for You?

Which package you use depends on what kinds of forecasting tasks you need to do—and how much you're willing to learn about forecasting methodology.





After you specify what to import from your spreadsheet, 4Cast/2 prompts you to see if the data it's importing is correct.

forms well with trend data but poorly with seasonal data. Its graphics and statistics are adequate, but the capability to save and print customized products is very limited. Overall grade: C

Autocast II is the fastest of the four but limited in its techniques. Its automatic forecasting feature is *too* automatic, not even revealing what technique it uses. Graphics and statistics are fine but not highly customizable. Overall grade: C

Can forecasting be done by nonexperts with present software technology? Yes, with some caveats. While it is possible to maintain your data in a spreadsheet, you will have to either restrict the data format or add information required by the forecasting package. This means changing the way you work on the spreadsheet or copying data to a temporary spreadsheet file when it's time to forecast. The good news is you won't have to reenter data in a new file format.

Automatic forecasting is by no means foolproof. I found the methods used to select a forecasting technique had built-in biases. The expertise built into the packages could usually be trusted to pick an adequate method, but not always the best one. For best results you'll need to become familiar with different forecasting techniques, even as you continue to produce business forecasts.

Peter D. Varhol is a freelance writer and assistant professor of computer science and mathematics at Rivier College in Nashua, New Hampshire. Richard Scoville is a contributing editor for PC World.

WHERE TO BUY

Forecast Pro for Windows 1.1a
Business Forecast Systems, Inc.
68 Leonard St.
Belmont, MA 02178
617/484-5050,
617/484-9219
Reader service no. 767

Autocast II 1.16 and 4Cast/2 4.0
Delphus, Inc.
103 Washington St.
#348
Morristown, NJ
07960
201/267-9269,
201/829-0757 (fax)
Reader service no. 768

SmartForecasts II 2.15
Smart Software, Inc.
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Utilities

A COMPLETE GUIDE TO SOFT

It doesn't matter what you use your PC for. Sooner or later you will accidentally erase a file, watch a mistake or virus wipe out your hard disk, or confront an out-of-memory error when you have 2MB free. That's why you need a good set of utility programs.

When people talk about utilities, two collections spring to mind: Symantec's *The Norton Utilities* and Central Point Software's *PC Tools Deluxe.* As Lenny Bailes demonstrates in "Norton vs. PC Tools," each of these programs has its own style

WARE YOU CAN REALLY USE

and comes with a different complement of utilities, but either set of programs can recover an accidentally deleted file, resurrect an unintentionally formatted hard disk, or pull your disk's FAT out of the fire.

Neither collection is complete; each lacks some important functions or offers them in a very limited way. In other words, whichever you buy, you'll want to supplement it with other programs. The remaining articles in this section show you how *Norton, PC Tools,* and some of their more specialized competitors handle important chores.

The right tools can help your hard disk work faster and last longer, so in "Disk Optimizers," TJ Byers examines seven hard disk care-and-feeding programs, including those that come with *Norton* and *PC Tools.* How do the libraries fare in this category? *Norton* wins the Best Buy, while *PC Tools* destroyed data in some situations.

But *PC Tools* gets its time in the sun: *Central Point Backup for Windows,* bundled in *PC Tools,* wins a Best Buy in David Fogle's "Backup Software." *The Norton Utilities* isn't even in the running here. Although *Norton Backup for DOS* also wins a Best Buy, it's not included as part of *The Norton Utilities.*

Today's processors can handle RAM with aplomb, but if you depend on DOS alone, you'd never know it. In "Memory Managers," Brett Glass looks at six memory managers (neither *Norton* nor *PC Tools* enters this category) to find out which can best help you push DOS into efficiency.

Sad to say, keeping your data safe from accidents and wear isn't enough these days. In "Antivirus Software," Patrick Marshall tells you what to look for in virus-protection software and lists the salient features in 24 antivirus programs.

Some of the best utilities don't fit into these categories. In "The Experts' Favorites," nine *PC World* contributors tell us their favorite DOS, *Windows,* and application-enhancing utilities.

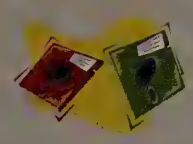
All told, over 100 programs and packages are discussed. That's just a sample of the utilities available, but trust us, it's the cream of the crop.

What the Two Leaders Have and Have Not

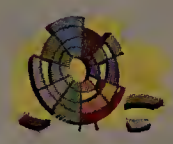
Although each includes many utilities you'll need, neither The Norton Utilities nor PC Tools gives you everything. In fact, if you owned both libraries, you'd still need a separate memory manager and antivirus program.

● Yes ○ No ◒ Limited

	The Norton Utilities 6.01	PC Tools 7.1
Undelete/unformat	●	●
Disk optimizer	●	●
Backup	○	●
Memory manager	○	○
Virus protection	○	◒



NORTON VS. PC TOOLS
Page 132



DISK OPTIMIZERS
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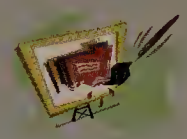

BACKUP SOFTWARE
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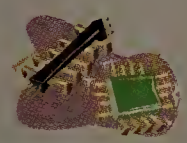

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ILLUSTRATIONS BY WAYNE VINCENT

Norton vs. PC TOOLS

Who you gonna call when your data is lost or damaged? Either of these rival utility libraries can save the day—and deliver a big bonus of productivity tools besides.

BY LENNY BAILES

Actually, three things in life are certain: death, taxes, and data disaster. If you've got a deadline to meet and suddenly find yourself staring in horror at error messages about damaged files or lost data, it's time to call in Symantec's *The Norton Utilities 6.01* or Central Point's *PC Tools 7.1*. Both of these utility libraries claim to hold the high ground on data recovery.

At one time, Central Point and Norton stood at opposite poles in the marketplace: *PC Tools* provided data recovery, but only as part of a bundle that included a menu-driven DOS shell, backup software, a calendar, and so on, while *The Norton Utilities* specialized in data recovery. Over the years, however, both packages have beefed up their features to the point where their similarities now outnumber their differences.

The current versions of both these easy-to-use, menu-driven packages let you salvage deleted files and damaged directories and unformat or defrag a disk. You can copy and move files via a tree-based file manager, cache disk reads and writes for faster system performance, protect your PC against virus infection, and put passwords on your files to prevent snooping. (Many of these features are discussed in "Disk Optimizers" in this special section.) While DOS 5.0 includes undelete and unformat utilities (licensed from *PC Tools*, incidentally), it lacks most of those other features.

Feature for feature, *Norton* and *PC Tools'* undelete capabilities are matched evenly: Both packages provide file recovery, promise to restore data after a serious hard disk disaster, and enhance the undelete feature provided in DOS 5.0 by giving you the option of storing deleted files in a hidden subdirectory (see the sidebar "Undelete Helpers: Monitors, Sentries, and Watchdogs" for details).

When it comes to rescuing data from serious peril, however, the two packages display significant differences—as our head-on data-death shoot-out demonstrates. We "accidentally" formatted disks full of files, deranged the File Allocation Table (FAT), trashed worksheets, and deleted mission-critical data files (not all at the same time, of course). Then we tried to get the data back. While each package clearly has its strengths, our tests indicate that *Norton* is more dependable overall.

Outside the data recovery arena, each library has special talents. *Norton* lets you set cursor size and mouse speed and change screen colors. It also provides an enhanced batch file language and pop-up help for system commands and lets you add

40-character descriptions to file names. *PC Tools* lets you open file directory windows and start programs by clicking on associated data files with a mouse. It also lets you view *1-2-3, WordPerfect,* and *dBASE III* and *IV* data files in native formats and includes both DOS- and *Windows*-based backup utilities.

While DOS 5.0 can do many of the same tricks as *Norton* and *PC Tools,* the libraries are a lot friendlier. For instance, intuitive dialog boxes in *Norton* and *PC Tools* make it easy to search through disk files for specified text strings. To do the same search with DOS 5.0, you'd have to construct elaborate sets of FIND and SORT commands. Similarly, *Norton*'s and *PC Tools'* menu-driven file management features spare you the command-line agonies DOS requires to move or rename subdirectories. (It's hard to believe that after five versions DOS still can't do this.)

Take a Walk on the File Side

Some features in *The Norton Utilities* and *PC Tools* can be found in more narrowly focused (and less expensive) PC products. For instance, Gazelle Systems' *OPTune* (reviewed in "Disk Optimizers" in this section) is a solid disk optimizer, and XTree's *XTreeGold* is a fine file manager. But only *Norton* and *PC Tools* provide such a variety of useful functions in one box.

Because of the diversity of their features, it's difficult to pick a Best Buy. If you're after world-class data recovery and hard disk tune-up features, *The Norton Utilities* is the one to buy. If your goal is to set up a file management command center or back up your hard disk, *PC Tools* makes more sense. But read on: In this review we'll walk you through a feature-by-feature comparison of the two utility titans to help you decide which package best suits your needs.

Data Recovery: Major Disk Disaster

You try to open a file and find yourself staring at a 'data error reading disk' message. This kind of thing happens to other people, right? In fact, it happens to everyone, and a lot more often than you might think. DOS provides two FATs that keep track of where files are stored on the hard disk—and both have to match. If one or the other is corrupted, you can lose access to huge numbers of files.

Both *The Norton Utilities'* Disk Doctor and *PC Tools'* Disk-Fix are designed to spot and respond to this common disk disaster. At worst, they will collect stray clusters and file fragments into separate files for you to reassemble manually. At best, they will fix the problem without your having to do any more than breathe a sigh of relief.

There are more ways to trash a FAT than are dreamt of in your philosophy—and we had only limited time for testing. So we settled on creating one typical problem: We corrupted one of the two FATs on our test drive and let *Norton* and *PC Tools* take their best shot at saving the day. Both utilities recognized that the FATs didn't match, but they chose very different strategies to repair the problem. *Nor-*

ton decided the lost disk clusters were no longer assigned to any file and offered to save them to a single file or delete them. *PC Tools* repaired the mismatched FATs perfectly without manual intervention. While in this scenario *PC Tools* clearly outperformed *Norton*, there are so many different kinds of FAT disasters that we have no hesitation recommending you keep both these programs on hand.

Norton and *PC Tools* both offer to help you back up your drive information to a floppy before starting repairs since neither recovery function is guaranteed. With both utilities, the undo function worked fine, successfully restoring the disk to the condition it was in before the repair attempt. But we still suggest that before attempting repairs, you do your best to copy any important data you can find intact on your hard disk to a floppy or tape.

Data Recovery: Unformat

No matter how many 'Are you sure Y/N?' messages appear on screen, most of us have still managed to accidentally format a disk full of irreplaceable data. Unformat can help—especially if you've been using an "unformat helper" like *PC Tools'* Mirror or *Norton's* Image that takes a snapshot of the FAT. Even in cases where the hard disk has not been accidentally formatted, if CHKDSK reports a huge number of cross-linked files, running Unformat can still be your best form of damage control.

For our first set of unformat tests, we disabled the unformat helpers, Mirror and Image. *Norton* brought back everything except the files in the root directory, but *PC Tools* failed to retrieve any of the lost data. When we turned Mirror and Image back on, both packages were 100 percent successful. However, you should be aware that *PC Tools'* Mirror file is position sensitive, whereas *Norton's* Image is not. That means in cases of severe disk damage, *Norton's* Image file is more likely to be usable. Overall, *The Norton Utilities* delivered the most reliable results.

Undelete Helpers: Monitors, Sentries, and Watchdogs

There was a time when *any* undelete utility seemed like a miracle. But an undelete utility alone can't always restore damaged or deleted files. Using an "undelete helper" ensures successful data recovery almost 100 percent of the time. There are two main techniques used: the *sentry* strategy, and the *delete tracking* approach.

Both *PC Tools'* Data Monitor and *Norton's* Erase Protect use the sentry strategy: They store deleted files in a hidden subdirectory. If you want the files back, you can restore them with perfect results. The downside is that the hidden directory can eat up all the space on your hard disk. Both packages try to avoid this by allowing you to set a maximum size for the hidden directory—and by purging files after the number of days you specify.

In addition, *PC Tools* offers delete tracking. No hidden file subdirectory is required. Instead, Data Monitor saves basic information about erased files—where the file was stored and how many clusters it occupied—in a small log file. Recovery of erased files with tracking is not nearly as certain as it is with the sentry method. (DOS 5.0 includes a feature similar to delete tracking.)

Sometimes data loss goes beyond accidental deletion. In cases of large-scale disk damage, both *PC Tools* and *Norton* can help—especially if you use their respective unformat helpers, Mirror and Image. These watchdog utilities, which make a copy of your FAT, are not meant for recovering deleted files, but if your entire hard disk is damaged or accidentally formatted, recovering your data is much easier if the FAT has been copied first. (The unformat utilities in both packages will attempt a hard disk recovery without using the FAT snapshot, but success is not guaranteed.)

One interesting difference between *Norton* and *PC Tools* concerns their capability to find the snapshot file after a major disk catastrophe. *PC Tools'* Mirror is position sensitive: In a worst-case scenario, it may not be able to find the snapshot. *Norton* doesn't care where the FAT copy is stored; if it's intact, Image will find it.

Data Recovery: Undelete/Unerase

Your likeliest use for one of these programs is to recover a file you accidentally deleted. Both provide undelete helper utilities that guarantee successful file recovery by temporarily storing deleted files in a hidden subdirectory. *PC Tools'* has an additional file recovery feature: It maintains an index that tracks deleted-file locations and sizes.

Again, we began our tests by disabling the helpers. *Norton* was still able to recover every file in our test scenario. *PC Tools* was less successful, in one instance refusing to recover files with duplicate file names in nested subdirectories. With the helpers enabled, both products were 100 percent effective.

If you write new files to the hard disk before attempting to recover a deleted file, your odds of recovery take a sharp nosedive. Both *Norton* and *PC Tools* predict the probability for recovery for each lost file. If the prognosis for a particular file is poor, you may still be able to find a salvageable portion by using the tedious manual data recovery options, which allow you to scan your hard disk for usable remnants from deleted files. Overall, *The Norton Utilities* took the top spot on file undeletion.

Specialized Salvage Tools for Worksheet and Data Base Files

Both *Norton* and *PC Tools* offer utilities for the repair of damaged (or imperfectly undeleted) *1-2-3, Symphony,* and *dBASE III* files. These tools let you set field boundaries for data base records, manually reconstruct header information, and splice a header from a healthy file onto one that is ailing. In our tests, both utilities repaired corrupted worksheets and data files, but *PC Tools* left you with a bit more "hand work" to do.

One more thing: Be careful running these utilities on files you're not certain are damaged. When we tested them on good files, both products actually caused damage to some files. *The Norton Utilities'* changes were generally benign, except with one worksheet, where it failed to recognize some formulas and removed a row of cells. *PC Tools* was less friendly, corrupting indexing information in some DBF files and changing column-width and cell-protection information in several files.

FEATURES EVALUATION

Everything You Need to Save Your Files (and Your Neck)

Between them, these two packages have everything you need in a utilities library.

● Yes
○ No
◒ Deficient

	The Norton Utilities 6.01	PC Tools 7.1
Standard features		
Price	$179	$179
Menu driven	●	●
Mouse support	●	●
TSR (terminate and stay resident)	○[1]	●
Disk cache	●	●
Defrag hard disk	●	●
Refresh low-level format	●	●
Link through serial port/LAN	○	●
DOS and applications advisor	●	●
Data recovery		
Undelete files	●	●
View deleted files	●	●
Estimate undelete probability	●	●
Search/recover data and file fragments	●	●
Repair 1-2-3, Symphony, and dBASE III files	●	●
Undelete directory	●	●
Diagnose and repair directory structure	●	●
Unformat hard or floppy disk	●	●
Revitalize damaged floppy	●	●
Make any disk bootable	●	●
Edit disk structure, partition, FAT tables	●	○
File management		
Backup	○	●
Change file time/date stamp	●	○
Encrypt and wipe files	●	●
File management shell	○[2]	●
Menuing system	●	●

[1]Some accessories are TSRs.
[2]NDOS command shell allows point-and-shoot file manipulation.

	The Norton Utilities 6.01	PC Tools 7.1
File management (continued)		
Prune and graft directories	●	●
Search files for character string	●	●
Sort and rename directories	●	●[3]
View multiple DOS file formats	○	●
Productivity		
Antivirus protection	◒[4]	●
Appointment calendar	○	●
Auto-dialer	○	●
Batch file enhancer	●	○
Calculator	○	●
Change keyboard/mouse settings	●	○
Change display settings	●	○
Enhanced command shell	●	○
File transfer link	○	●
Line print utility	●	●
Remote control	○	●
System information/benchmarking	●	●
Telecommunications	○	●
Timer	●	○
Service and support		
Warranty	60 days	60 days
Money-back guarantee	●	●
Toll-free support	○	○
Daily support (hours)	10	11
Weekend support	○	○
BBS/fax support	●/●	●/●

[3]Directory sort affects view only; new directory is not written to disk.
[4]Protection against boot-sector infection only.

Hard Disk Tune-Up: Optimization

Both *PC Tools* and *The Norton Utilities* provide a variety of disk optimizing features, including defragging, surface testing, and nondestructive low-level–format refresh. *Norton* takes top honors in this category thanks to its speedy performance, ease of use, and reliable safe mode (see "Disk Optimizers" for more details).

File Management

The Norton Utilities and *PC Tools* both include a variety of useful file management features, but there's a big difference in approach: Whereas *PC Tools* gives you a menu-driven command center with all the features integrated, *Norton* includes many separate programs designed for users who prefer working with the DOS prompt.

Both libraries let you use point-and-shoot menus to implement basic DOS functions such as COPY and DELETE,

Norton Desktops: Getting Past DOS and Windows

DOS 5.0 is a lot friendlier than prior versions, and *Windows 3.1* is much easier to use than *3.0*. Still, most people find working with these powerful environments a bit like taking a trip on an ocean liner with no dining room and no lifeboats. If you're looking for a safer, more comfortable way of cruising with *Windows*, check out Symantec's *Norton Desktop for Windows 2.0*. This newly upgraded utility library is a significant improvement over version 1.0. If you want many of the same conveniences without *Windows*, look into the spanking-new *Norton Desktop for DOS 1.0*, which combines many features from *NDW* and Symantec's DOS shell, *Norton Commander*.

The most important items built into both packages are an easy-to-use directory-tree file manager and a command center with pulldown menus. Together, they let you launch applications; view, print, copy, delete, and rename files; and format and copy disks—all via a goof-proof, point-and-shoot interface. In addition, you get a full-featured version of *The Norton AntiVirus* and a backup program to protect your data. Both packages include many of the same reliable utilities found in *The Norton Utilities 6.01*: You can recover deleted files, unformat and defrag a hard disk, get system information, and repair your directory structure. As a bonus you get a bevy of accessories, including a text-search utility, at least one pop-up calculator, a text editor, and a choice of screen savers.

Norton Desktop for Windows

Like version 1.0, *Norton Desktop for Windows 2.0* ($179) provides the flexibility you expected from *Windows* but never got. Its icon-driven interface lets you place program groups and directory windows anywhere you like on the desktop. And good as *Windows 3.1*'s improved File Manager is, *NDW* goes it at least one better. For example, directory windows contain user-definable, mouse-selectable button bars that can run programs and copy or move files to distant directories. In addition, you can view, print, and undelete files by simply dragging them over and dropping them on Tool Icons. Other features include a *Windows* batch language, an icon editor, a system information utility, and three calculators.

The biggest news in version 2.0 is the increase in speed. According to Symantec, *NDW* loads 30 to 50 percent faster than poky version 1.0. Additional improvements include 45 file-viewing filters—15 new ones, including *CorelDraw on CD-ROM*, *Paradox 3.5*, and *1-2-3 3.0*. If that's not enough, you also get a LAN install option that works with all the major network operating systems, and a free copy of *Norton Backup for Windows*.

Norton Desktop for DOS

Norton Desktop for DOS 1.0 ($179) looks and feels a lot like *NDW* but integrates added features from *Norton Commander* and *The Norton Utilities*. *Desktop for DOS* lets you position its directory tree and file windows wherever you wish, and you can customize its pulldown menus or create pop-up program-launch menus. You get some goodies that *NDW* lacks: a file compression utility for packing or expanding Zip files, 50 file viewers (5 more than *NDW*), a disk cache, a file encryption utility, and a calendar.

Neither version of *Desktop* is a complete replacement for *The Norton Utilities 6.01* or *PC Tools 7.1*. You don't get any low-level capabilities or read/write disk testing—both important features. Moreover, the two *Desktops* gobble huge amounts of disk space—7MB for the DOS version and almost 9MB for *NDW*. Still, these products have plenty to offer—especially if using DOS or *Windows* straight up has begun to feel like cruel and unusual punishment.

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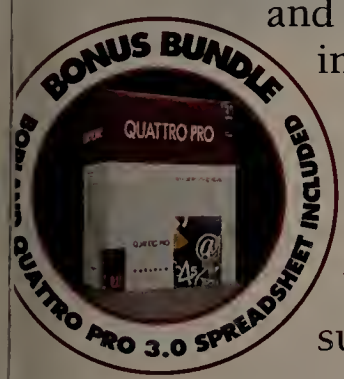

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Circle 67 on reader service card

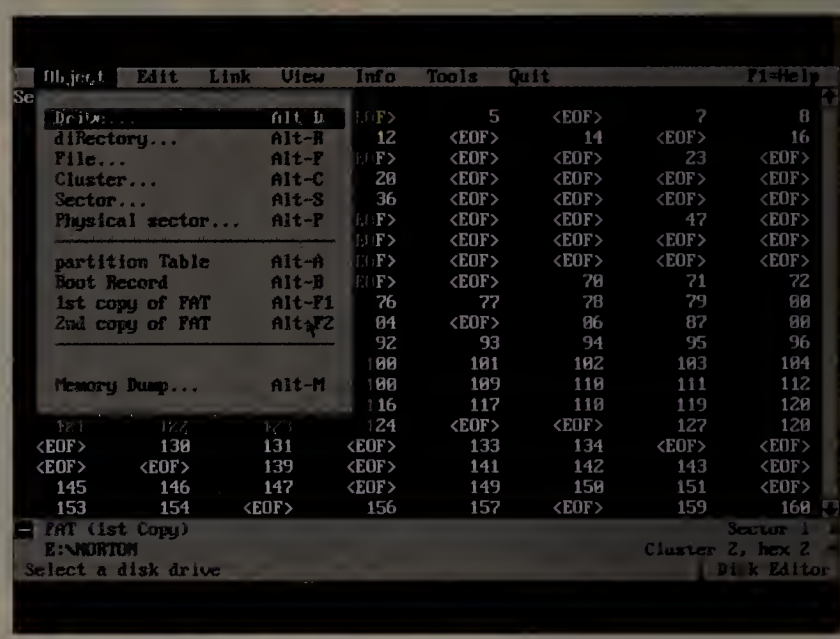
as well as long-needed functions like MOVE. And both will let you launch programs from a menu and rename directories from a tree display. But *PC Tools* makes all this easy, whereas *Norton* sometimes forces you to enter intricate commands to get to its menus.

PC Tools excels in some other ways also: It lets you view files from popular applications such as *1-2-3, dBASE,* and *WordPerfect.* It's a simple matter to split *PC Tools'* shell display into a directory tree, file listings, file viewer, and application menu and call other *PC Tools* functions like Undelete and System Info from its pulldown menus.

Norton can't match that particular bag of goodies, but it has its own tricks: You can prune and graft, change a file's time or date stamp, and permanently sort directories on a variety of criteria. *Norton* also gives you NDOS, a powerful alternative to COMMAND.COM that provides enhanced DOS commands advanced users will appreciate. For example, the NDOS SELECT COPY command brings up a list of files and lets you mark those you want copied. You can also attach 40-character descriptions to DOS file names and display them with a DIR command.

To protect sensitive files or directories, you can use either program to encrypt them with the Data Encryption Standard (DES) coding used by many government agencies or a faster, proprietary encryption algorithm. *Norton* also lets you encrypt a whole disk.

Overall, we have to declare *PC Tools* the winner in this category—mainly due to its impeccable DOS shell.



Norton's DiskEdit utility lets you edit your FAT and directory tables and even lets you examine your hard disk's boot record.

Productivity

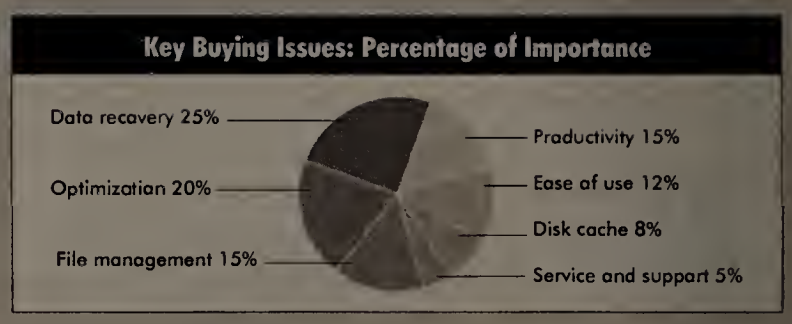
Norton and *PC Tools* both include some marvelous amenities. *PC Tools* sports a host of useful TSRs, such as a pop-up appointment calendar, a calculator, a file transfer utility, and a communications package. You even get *Commute,* a remote-control utility that lets you run another computer via network, direct-cable connection, or modem. *Norton* gives you a batch file enhancer that adds ASK statements, keystroke input, and ASCII line drawing to DOS's batch lan-

EXECUTIVE SUMMARY

Norton and PC Tools Run Neck and Neck

For just $179, either of these utility bundles can rescue data—and a whole lot more.

If your utilities library has to be tops at data recovery, **The Norton Utilities** is your best bet. It also gives you the fastest, safest hard disk tune-up utility, and DOS veterans will love its talent for directory manipulation. On the other hand, if you need to manage files easily from a command center and want a host of desktop productivity aids and a free Best Buy Windows backup program, **PC Tools** is the product for you.



Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Data recovery	Optimization[1]	File management	Productivity	Ease of use	Disk cache	Service and support	Overall value
The Norton Utilities 6.01	757	☆☆☆☆	☆☆☆☆	☆☆½	☆☆	☆☆☆☆	☆☆☆	☆☆☆☆	★★★½
PC Tools 7.1	758	☆☆☆	☆☆☆	☆☆☆½	☆☆½	☆☆☆☆	☆☆☆½	☆☆☆☆	★★★½

[1] Ratings carried over from "Disk Optimizers" in this issue.
Overall value is calculated by multiplying each category rating by the category's weight percentage, summing the results, and rounding to the nearest half number.

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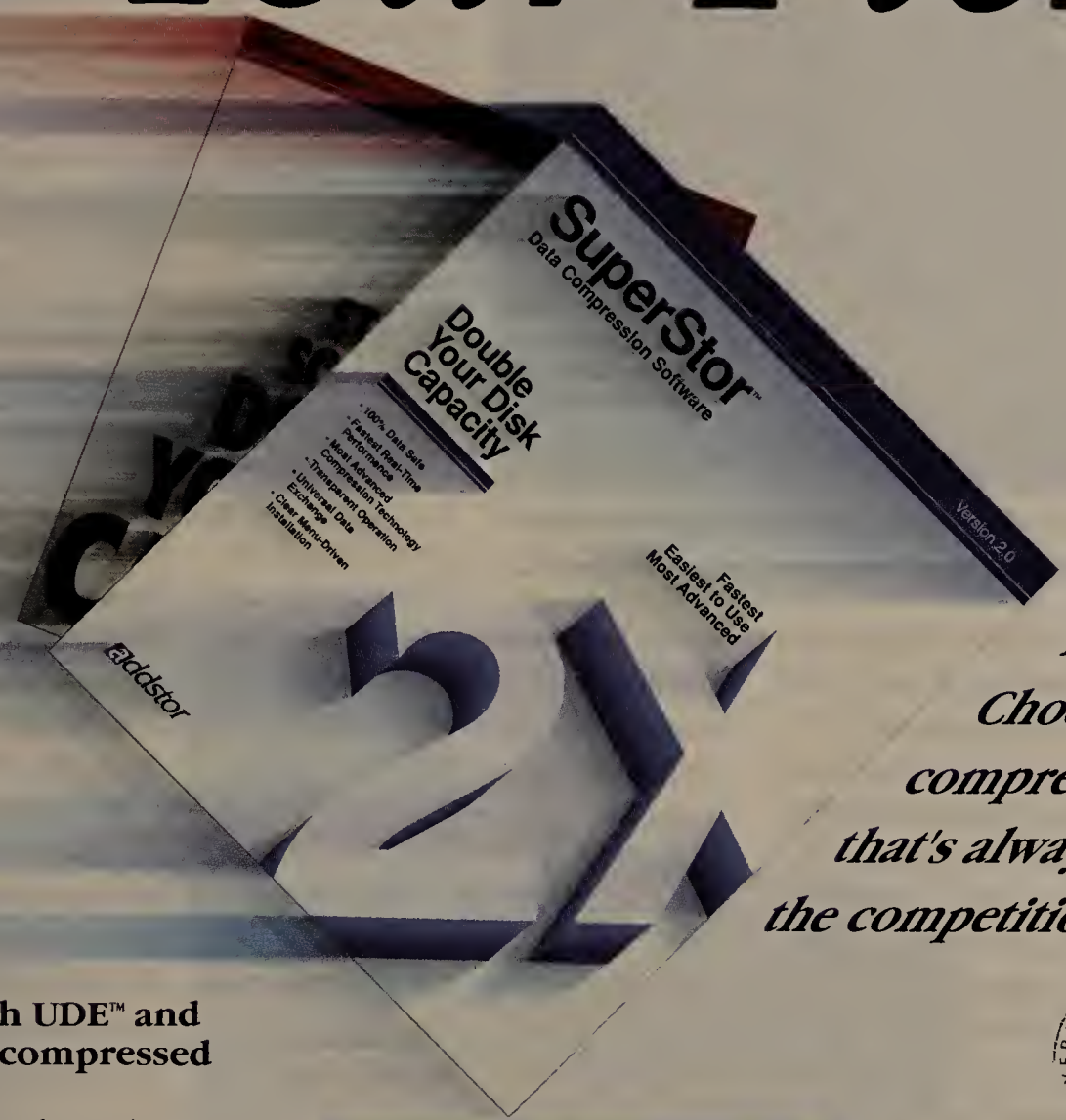

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	✓	***FIRST*** **to provide menu-driven installation!**
	✓	***FIRST*** **to be featured in a major disk operating system (DR DOS® 6.0)!**
	✓	***FIRST*** **to recognize whether a diskette is compressed or not (Automount)!**
	✓	***FIRST*** **to offer Recompress, providing up to 25% more compression performance (over ver 1.3)!**
	✓	***FIRST*** **to offer Universal Data Exchange (UDE) that lets anyone read your compressed data on any PC!**
	✓	***FIRST. . . !***

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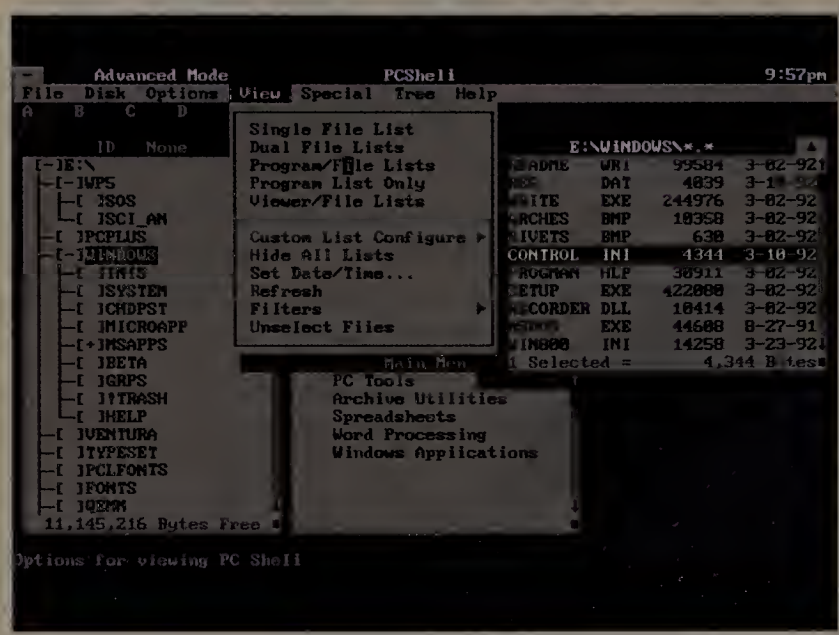

PC Tools' command shell gives you a full file management toolbox and lets you view files and launch programs from custom menus.

guage. You can also edit PATH and other environment statements on the fly and assign aliases to DOS commands.

But even where both libraries boast similar utilities, you'll find critical differences between them. For instance, *Norton* and *PC Tools* contain valuable online help, so when you see one of DOS's cryptic error messages, such as 'error reading FAT' or 'disk is cross-linked', you can go to *Norton*'s or *PC Tools'* online help for a translation. But *Norton* also offers help on error messages from such widely used applications as *WordPerfect*, *1-2-3*, and *dBASE*, while *PC Tools* adds step-by-step diagnostics for problems involving TSRs.

Norton's text-search utility is more powerful than *PC Tools'*, allowing you to specify case-sensitive text strings, search erased files, and run interactive or noninteractive searches. *PC Tools* can't do any of those tricks, but its search capabilities are integrated into its DOS shell and so are easier to use.

When you have to install new peripherals, you'll appreciate *The Norton Utilities'* and *PC Tools'* system information programs. Easy-to-read summaries show the number of parallel and serial ports installed, the type of video card, and the amount of extended and expanded memory available. Advanced diagnostic screens provide you with detailed information on hard disk and memory usage, and a list of system interrupts. In addition, the two packages include benchmark testing for the computer's CPU and hard disk system—and both work equally well.

Finally, both packages include limited protection against boot-sector virus infection. *PC Tools*, however, is slightly better because it also delivers a TSR that checks for viruses when you load or copy EXE files and blocks unauthorized disk formats. But neither product can decontaminate your system once it's contracted a virus.

Based on the sheer number and diversity of its features, *PC Tools* is the productivity winner. *Commute* alone lists for $129 when sold separately. The communications package and desktop utilities only add to this library's value.

Disk Caches

A good disk cache speeds up hard disk performance significantly, and both *Norton*'s NCache and *PC Tools'* PC Cache include a number of advanced features. You can turn caching on and off for specific drives, toggle write-caching on and off separately from read-caching, and adjust buffer size for optimal performance. *PC Tools* ran more happily than *Norton* did with AddStor's *SuperStor* background compression utility. *Norton* caused our system to crash whenever it accessed a *SuperStor* drive, even when instructed to exclude that drive from the cache. That makes *PC Tools* the clear winner here.

Backup

PC Tools 7.1 includes two of the most popular backup programs available: the DOS and *Windows* versions of *Central Point Backup 7.1*. (The *Windows* version is a *PC World* Best Buy; see "Backup Software" in this section.) They're $129 sold separately, so their inclusion is quite a prize. *The Norton Utilities* includes nothing that can compare—at least not bundled into this package—but *Norton Backup 2.0 for DOS*, a Best Buy in the same backup review, can be had for $129, as can *Norton Backup 1.2 for Windows*.

Two Library Cards Are Better Than One

Each of these packages boasts a wealth of features—you'll have to pick and choose carefully to match their respective utilities to your needs. Since data recovery is the prime raison d'être of these libraries, *Norton* edges out *PC Tools* as overall winner—thanks to its superior performance on unformat and undelete. *Norton* is also the better disk optimizer.

However, *PC Tools'* file management command center and menuing system are tops—and it gives you a backup program and a remote computing package. To tell the truth, hard-core hard disk troubleshooters will probably want both libraries in their PC toolbox.

Lenny Bailes is the author of Memory Management and Multitasking Beyond 640K, *to be published this summer by Tab Books (Blue Ridge Summit, Pennsylvania). He lives in San Francisco.*

WHERE TO BUY

The Norton Utilities 6.01
Symantec Corp.
10201 Torre Ave.
Cupertino, CA 95014-2132
800/441-7234,
408/252-3570
LIST PRICE: $179
REQUIREMENTS: 512K, DOS 2.0 or later version
Reader service no. 757

PC Tools 7.1
Central Point Software, Inc.
15220 N.W. Greenbrier Pkwy. #200
Beaverton, OR 97006
800/445-4208,
503/690-8083 (fax)
LIST PRICE: $179
REQUIREMENTS: 640K, DOS 3.0 or later version
Reader service no. 758

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Storage	60, 85, 120MB*	60, 85, 120MB*	80, 120, 200, 400MB	120, 200, 400MB	300, 400, 500MB* (up to eight)
Memory (Standard/Max)	2/8MB* 4/12MB*	2-4*/12MB	4/64MB	4-8*/128MB	4-8*/192MB
Video	VGA display up to 64 gray scales	VGA display up to 64 gray scales or active matrix color	Integrated SVGA @ 1024x768 resolution with 16 colors. Upgradeable to 256 colors.		Integrated SVGA @ 1024x768 resolution with 16 colors. Upgradeable to 256 colors.
Pre-installed Operating Systems	MS-DOS 5.0 with APM	MS-DOS 5.0 with APM, Microsoft Windows 3.1	MS-DOS 5.0 Microsoft Windows 3.1		MS-DOS 5.0*
Integrated Connectivity	N/A	Novell NetWare, Microsoft LAN Manager, Banyan VINES client shells pre-installed	Novell NetWare, Microsoft LAN Manager, Banyan VINES client shells pre-installed		Novell NetWare, Microsoft LAN Manager, Banyan VINES, SCO™ UNIX®**
Upgrade Options	Memory, HDD, Coprocessor	Video display, Memory, BIOS, HDD, FDD, Coprocessor	CPU, Memory, BIOS, FDD, HDD, Coprocessor, OverDrive™ processor, Windows accelerator module (WAM), SCSI module, SCSI tape backup, hard drive		CPU, Cache, BIOS, HDD, FDD, Coprocessor, OverDrive processor, SCSI streamer and DAT tape drives, CD-ROM drive, LAN boards, Serial port boards
Mouse	Optional	Logitech™ TrackMan® Portable	Microsoft Two-button		Optional
Battery Life	2 or 2.5 hours under APM*	4-10 hours under Premier System Management™ (⅓ less in color)	N/A		N/A
Weight	6 or 6.2 lbs.*	5.9 or 6.5 lbs.*	N/A		N/A
Optional Peripherals	AT Docking Unit 3 slots AT compatible 2 half-height drive bays	READYDESK port replicator	N/A		N/A

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Disk OPTIMIZERS

Who can argue with a 200 percent Windows speedup? For as little as $50, one of these disk defragmentation and maintenance programs can guarantee peak hard disk performance.

Hard disks, like houseplants, seem to thrive on regular attention. You probably don't need to talk to your hard drive, but regular use of a good disk optimizer will keep your data in the bloom of health.

Most of the disk optimizers in this review offer a variety of functions, including surface testing and low-level format refresh, but defragging—finding data that DOS has scattered here and there on the disk, and collecting it into contiguous clusters—is the single most important benefit: It can accelerate DOS performance on a badly fragmented hard disk by around 30 percent, and help *Windows* disk tasks run twice as fast. Plus, it will extend the life of your hard disk by reducing wear and tear caused by repeated head movement.

How should you choose the best defragger? Just answer a few easy questions.

How many defragging strategies does the package have? There are three primary types: full, quick, and space-only. All the optimizers we looked at offer a full defrag, which consolidates data *and* moves all the free space to the back of the disk. All but one (*Vopt*) offer a "quick" mode as well, which consolidates data but leaves spaces between files. But only two (*The Norton Utilities* and *PC-Kwik Power Disk*) give you the handy space-only option, which saves you time by consolidating free space at the end of the disk *without defragging the files.*

This space-only option is particularly useful for *Windows* users. *Windows* needs plenty of contiguous free space to create swap files—and for best performance, it's a good idea to defrag free space daily. While a full defrag also consolidates free space, it may well take an hour or two. Since a space-only defrag usually

BY TJ BYERS

takes no more than 60 seconds, you can run it every morning or evening without losing valuable work time.

Next question: How long does it take to do the defrag? Since our tests show that a quick defrag offers just as much performance improvement as a time-consuming "full" defrag, we based our elapsed-time comparisons on quick mode. Even so, there was quite a range. *Power Disk* and *Norton* were fastest.

Also worth asking: Do different defraggers deliver different performance improvements? As a matter of fact, all the defraggers we tested delivered roughly the same speedup in quick mode. The difference comes when you factor in file placement options.

Putting frequently read files and directories at the front of the disk (where they can be read a bit faster) can often provide a 10 percent performance gain—assuming your optimizer gives you the option. Moreover, if a defragger lets you move read-only files (like EXE and COM files) to the front, while placing read-write data files at the back of the disk, it will help *keep* your disk defragged—and running faster. All but one of the optimizers here (*Vopt*) let you move individually selected files and directories to the front of the disk—but only four let you place files at the back.

Buying Smart: Optimizers Speed Disk Performance

When the MFM Winchester hard disk was introduced about ten years ago, it was a delicate device, prone to failure and frequent data loss. The disk optimizer was invented to curb or cure these problems. Naturally, optimizers defragged files—but given what they had to work with, they needed to do a lot more than a defrag.

The iron-oxide surface coating was about as flaky as the drives themselves—literally. Vibration, head crashes, and poor adhesion caused pieces of the coating to flake off, taking stored data with them. The cure was a *surface tester*, which scanned the disk looking for newly damaged areas. When it found one, it would try to recover any data it could, and then mark the area to prevent its further use.

In addition, as the drive aged, the head-positioning cam would wear down, causing the head to drift away from the magnetic tracks created during the initial low-level format. As if that weren't enough, magnetic information recorded on iron oxide (including the all-important disk sector IDs that DOS uses to find stored data) tends to fade relatively quickly. The cure for both problems was a *nondestructive low-level format refresh:* working track by track, the low-level refresher utility would remove the data, lay down a new track, rewrite the fading sector ID, and restore the data.

AND NOW THE GOOD NEWS

Modern IDE, SCSI, and ESDI drives are free of many of these problems. New head positioning hardware (primarily improved electronic voice coil technology) makes it much harder to "lose" the original tracks, eliminating the need for nondestructive low-level formatting. And since the new, highly polished, chrome-plated disks retain magnetic data almost indefinitely, there's no need to refresh sector IDs. General failure mean time (the point at which the average hard disk crashes and burns) now comes sooner than magnetic media fade-out.

Moreover, the new surface platings are not only flake free but more tolerant of vibration and head crashes as well—and what few bad spots appear during use are handled by built-in error-correcting hardware. Hence the surface tester is swiftly becoming as much of a relic as low-level formatting.

But don't give away your disk optimizer yet. Defragging delivers just as much of a speedup with IDE, SCSI, and ESDI drives as it did with the older MFM and RLL disks. And, of course, if you're still using an older drive, you can join the thousands of others who still need surface testing and nondestructive low-level format refresh. Only three of the optimizers in this review—*Norton, OPTune,* and *PC Tools*—provide all these features.

PERFORMANCE

When we speak of optimizer *performance*, we don't mean how much faster your disk accesses will be—we mean, simply, how long it will take an optimizer to defrag your disk. The sooner it's done, the less time you'll spend hanging around the water cooler—and the more likely you are to defrag regularly. Speed is less important if you can start the defrag at the end of the day and walk away—but this leaves your PC vulnerable to anybody who happens by. The fastest optimizer (in quick mode) was *Power Disk*, with *The Norton Utilities* second.

DEFRAGMENTATION FEATURES

All seven products offer a "full" defrag mode that consolidates file segments and moves free space to the end of the disk. While it's relatively time-consuming, this strategy delivers the best results: It defrags all files no matter how big, minimizes subsequent head movement (and its wear and tear), provides maximum continuous free space for *Windows* swap files, improves disk caching performance, and keeps the disk defragged longer. You will usually need to do a full defrag only once. After that, quick defrags will keep the disk running just as fast—as long as your files are not exceedingly large.

Final question: Are they safe? Vendors don't advertise the fact, but optimizers can destroy your data if the power goes out while they're working—because they are constantly rewriting the File Allocation Table (FAT). Only a "safe" mode can protect your data in case of power failure. So, before we put these products back in their boxes, we ran them through the ultimate disaster test: We pulled the plug smack in the middle of defragging, simulating a power failure.

One solid Best Buy emerged from the fray: *The Norton Utilities.* It boasts outstanding defragging options, as well as a good set of low-level and surface testing features. If you use an IDE or SCSI hard disk, you'll find that you have little use for surface testing or low-level format refresh, but anyone who still owns an older MFM disk will benefit greatly from these functions (see Buying Smart for more details).

TJ Byers is a contributing editor for PC World. *He can be reached on PC World Online (see page 8 for more information).*

For more information about all products in this article, circle reader service number 906.

Almost as good (and a lot faster) is the files-only, or "quick," option. This technique consolidates scattered files into connected segments while ignoring the free space between the files. In most cases, this strategy produces full performance benefits. (One small point, though: If your disk is short of continuous free space, some quick defraggers may not connect all the segments of very large files, which will reduce your performance improvement.) Six of these seven optimizers give you a quick option.

Two of these products—*Norton* and *Power Disk*—offer a free-space–only strategy that closes up the free space in mere seconds *without* defragging files—a feature that *Windows* users will find extremely handy as a daily regimen.

Placing selected files and directories at the front of the disk (where the heads can read them a bit more quickly) can goose your performance up to 10 percent over a vanilla defrag. Moreover, if a defragger lets you move static files (like EXE and COM files that seldom change) to the front, while placing frequently changing data files at the end of the disk, it will *keep* your disk running faster because it will stay relatively defragged. Unfortunately, only four of the optimizers we looked at give you the back-of-the-disk option, and two of these force you to edit a complicated ASCII file to do the job.

EASE OF USE

Because a mistake can destroy your data, ease of use is very important. Look for clear, well-designed menus with context-sensitive help and mouse support. Look for a "safe" mode, too. Most programs write to the File Allocation Table (FAT) while defragging, and loss of power can mean irreversible loss of data. While any safe mode is far better than none, we prefer safe modes that can be turned on and off. That way, if your PC is protected by an uninterruptible power supply (UPS), you can turn off the safe mode for faster performance. *Norton, OPTune,* and *Power Disk* tie for top honors in ease of use.

LOW-LEVEL REFRESH

IDE, SCSI, and ESDI drives don't need low-level refresh, but older MFM and RLL drives do. Four of these products (including our Best Buy) can rewrite tracks and refresh sector IDs without damaging data.

SURFACE TESTING

Very few IDE, SCSI, and ESDI drives need surface testing. But users of older MFM and RLL drives can use the services of a good surface analyzer to maintain data integrity by finding and locking out media defects that may have developed since they last formatted their disks.

Read-only testing is the fastest technique, but its analysis is superficial. Read/write testing starts by reading a sector's existing data and moving it into memory. Then it writes test data to the sector and attempts to read it back. If the data read is identical to the data written, the sector is considered good and your original data is replaced. While this process is more accurate, it has the potential of destroying data should something go wrong. Look for programs that give you a choice. Ideally, if a surface testing routine discovers a new defect in a data file, it should be able to recover the data and move it to good sectors before locking out the bad sectors.

SERVICE AND SUPPORT

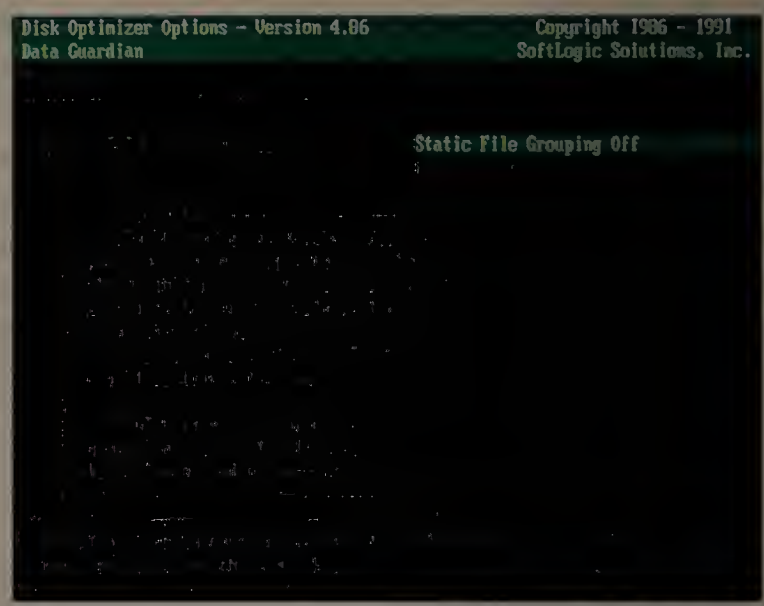
Insist on unlimited free support and a money-back guarantee. Toll-free telephone support numbers, extended hours, on-line (BBS) services, and fax support are real pluses too.

To evaluate technical support, we made three calls to each company. The calls involved asking a simple installation question, a disk compatibility question, then a tougher question on selecting the best defragging strategy for a particular application. We evaluated the accuracy and clarity of the answers and factored in the time needed to get an answer.

Disk Optimizer Tools 4.06

★★½ **PROS:** Inexpensive, flexible file placement, low-level refresh, unlimited disk size and file capacity **CONS:** Slow, no surface testing, no space-only defrag

For price alone, there's no beating SoftLogic's $50 *Disk Optimizer Tools*—and as a defragger, it's a solid value. It's one of the two optimizers in the roundup that place no limit on the number of files they can handle. While most people won't encounter problems in this area, bigger disks are becoming a lot more common—and between larger disk capacity and *Windows* applications' proclivity for generating work files, it's nice to know your optimizer isn't going to quit on you with an error message about too many files. And *Disk Optimizer* is one of only four packages that let you move files to the front *or* the back of the disk. There's only one flaw: Since *Disk Optimizer Tools* "chooses" files by extension only, not by name, it may end up putting some files where you don't want them. Also, like many optimizers running in quick mode, *Disk Optimizer Tools* had problems joining our huge 3.5MB text file when there was limited free space to work with: The best it could do was compact it into four blocks. Still, few users work with files this large—and those who do can always use a full defrag.



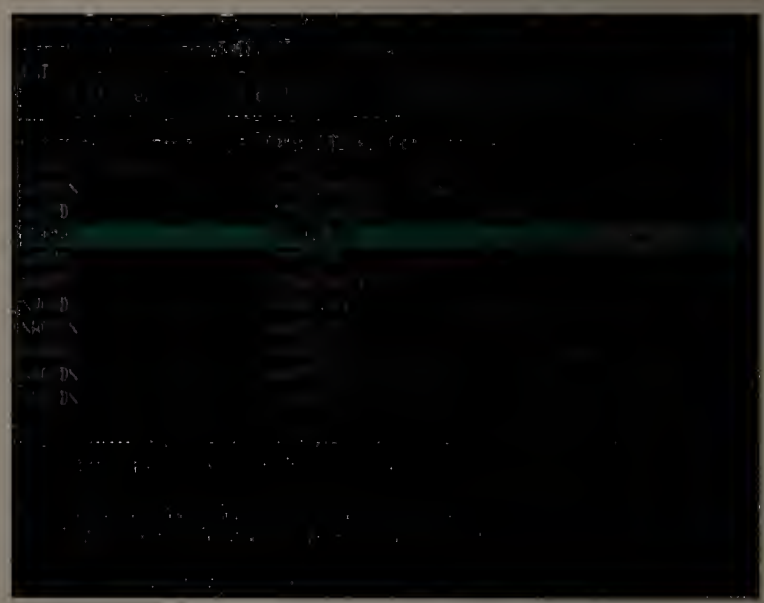
Disk Optimizer lets you move files to the front or back of the disk—but only by using a list of file extensions.

This package's main flaws are poky performance—it's the slowest optimizer we looked at—and lack of space-only defrag, which means that *Windows* users, who need to make sure their disks are graced with lots of contiguous free space, will be stuck with its time-consuming full defrag. Also, its lack of surface testing means that MFM disk users are out of luck. But if you're content to do your disk optimizing after hours (when speed doesn't count), and you have a modern IDE or SCSI disk that doesn't need surface testing, *Disk Optimizer Tools'* $50 price makes this product hard to resist.

FastTrax 4.03

★★½ **PROS:** Inexpensive, flexible file placement, lifetime warranty, 24-hour tech support **CONS:** No surface tester, no low-level refresh, disk size limited to 85MB

FastTrax is a $70 defragger with several cool features but too many limitations. Not only does it lack free space defrag (which penalizes *Windows* users), there's no mouse support, and in some cases—especially where system memory is limited to 640K—the largest disk it can handle is 85MB. (If you have 800K of expanded memory and an EMS driver, you can probably handle a larger disk.) Alternatively, if you reformat your disk with larger clusters, *FastTrax* should be able to handle disks of unlimited size (this requires a separate utility). On the other hand, *FastTrax* will defrag an unlimited number of directories and files. It also boasts a unique system that helps you place selected directories and files anywhere you want on the disk via a simple point-and-shoot menu. Simply designate a directory as top priority, and it will be moved to the front of the disk along with its files. High priority and medium priority come next. But the most useful part of this scheme is that if you assign a low priority to a directory with text or data files that change frequently, *FastTrax* will place the files at the back of the disk, where they will cause the least amount of disruption as they change.



The FastTrax menu lets you send text and data files to the back of the disk by assigning a low priority.

FastTrax made it through our power-failure test like a champ, with no data damage. And it gets top points for service and support, too: It comes with a lifetime warranty that includes 24-hour tech support you can reach seven days a week. Given Murphy's penchant for striking on evenings and weekends (when most support lines are dead), we always appreciate full-service hours like this. Moreover, $70 is a nice price—but given *FastTrax*'s disk-size limitations, not to mention its lack of surface testing and low-level formatting, this package falls a bit short.

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Circle 262 on reader service card

The Norton Utilities 6.01

★★★★ **PROS:** Fast, free space defrag, surface testing, low-level formatting, solid safe mode **CONS:** Expensive, can't move files to the back

For top-notch performance, impeccable ease of use, a goof-proof safe mode, and an exhaustive set of practical features, there's no beating our Best Buy winner *The Norton Utilities.* Its mouse-ready menus are a pleasure to use, and extensive context-sensitive help screens are only a keystroke away. And of course, its optimization features are only one small part of this $179 package, which comes with a bevy of useful utilities, like its world-class file recovery features, reviewed in "Norton vs. PC Tools" elsewhere in this issue.

The *Norton* Speed-Disk's full set of defragging strategies includes the capability to remove the free space between files without a time-consuming full defrag. Directories and/or individual files can be moved to the front of the disk for fast access. In fact, its only significant failing is the inability to send data and text files to the back of the pack. *Norton*'s read-write surface tester missed a few bad sectors in its lightest test mode, but nothing escaped its tougher tests. Just plan to run it over a three-day weekend, because it is *slow.* But when you factor in its generous collection of disk utilities, even $179 seems like a perfectly reasonable price.

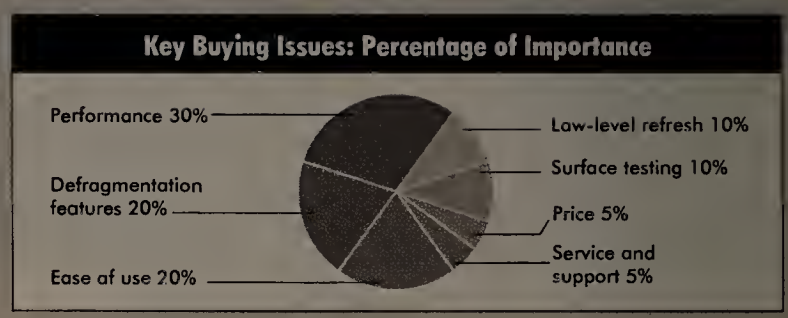
Norton offers a variety of defragging strategies, including the rare free-space–only option—ideal for Windows.

EXECUTIVE SUMMARY

Norton's Optimizer Wins Another Best Buy

Everyone can use a defragger, but older MFM drives can also use surface testing and low-level refresh.

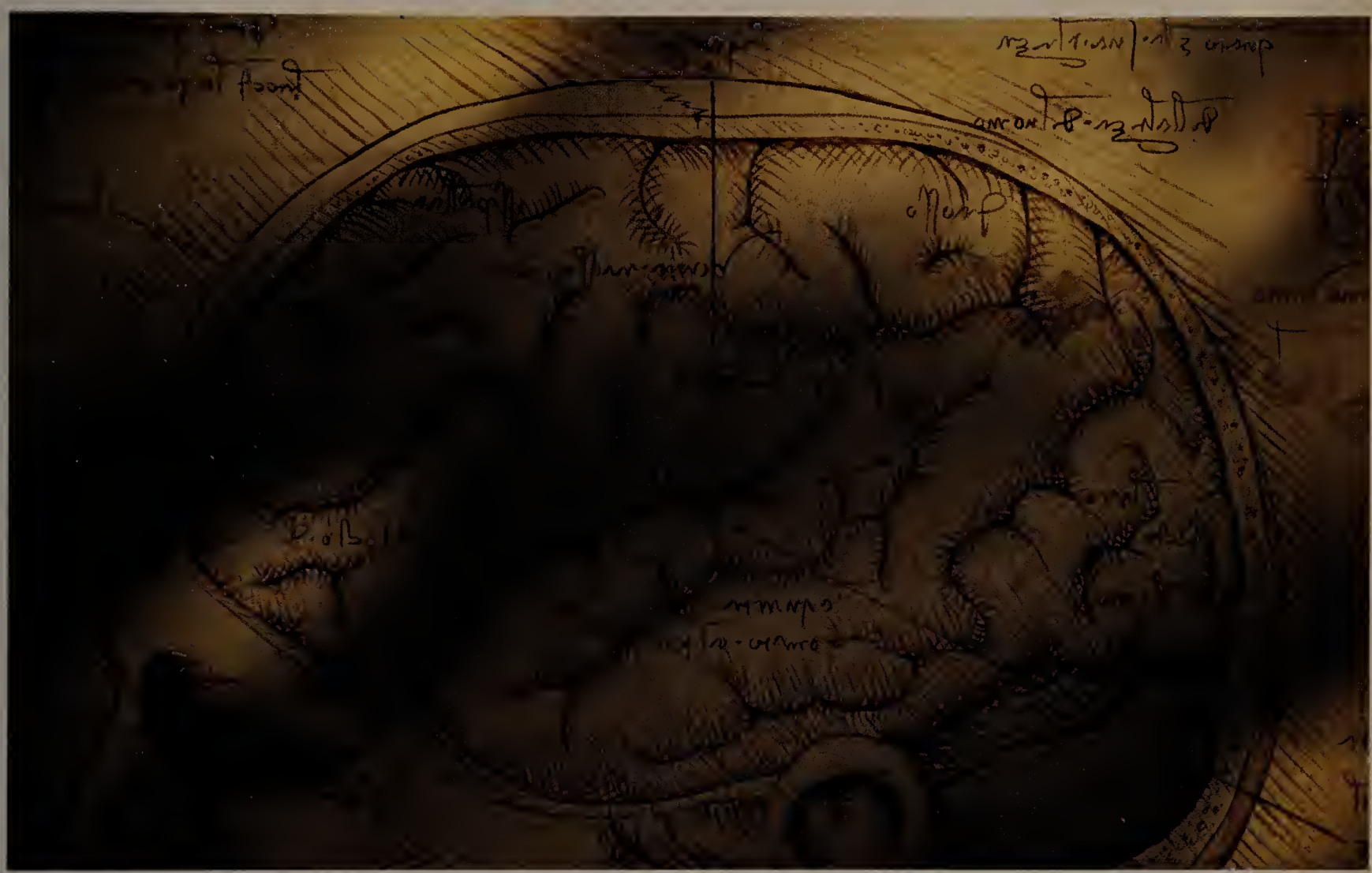
For the second year in a row, speedy performance, ease of use, and good scores on defrag and low-level refresh put Best Buy **The Norton Utilities** in the winner's circle. But IDE owners, whose hard disks don't need surface testing, interleave reset, or nondestructive low-level format, will want to check out **PC-Kwik Power Disk** too—which provides fine defragging at a much lower price.



Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Performance	Defragmentation features	Ease of use	Low-level refresh	Surface testing	Price	Service and support	Overall value
Disk Optimizer Tools 4.06	738	½	☆☆☆½	☆☆☆½	☆☆☆☆	n/a	☆☆☆☆	☆☆☆☆	★★½
FastTrax 4.03	739	☆☆½	☆☆☆	☆☆☆½	n/a	n/a	☆☆☆☆	☆☆☆½	★★½
The Norton Utilities 6.01	740	★★★★	★★★★	★★★★	★★★★	★★★	★★	★★★★	★★★★
OPTune 1.3	741	☆☆☆½	☆☆	☆☆☆☆	☆☆☆☆	☆☆	☆☆½	☆☆☆☆	★★★½
PC-Kwik Power Disk 1.1	742	☆☆☆☆	☆☆☆☆	☆☆☆☆	n/a	☆	☆☆☆½	☆☆☆☆	★★★½
PC Tools 7.1	743	☆☆½	☆☆☆☆	☆☆½	☆☆☆☆	☆☆½	☆☆	☆☆☆☆	★★★
Vopt 3.05	744	☆☆½	☆½	☆½	n/a	☆	☆☆☆☆	☆☆☆☆	★★

Overall value is produced by multiplying each category rating by its weight percentage, summing the results, and grading an a curve to the nearest half number.



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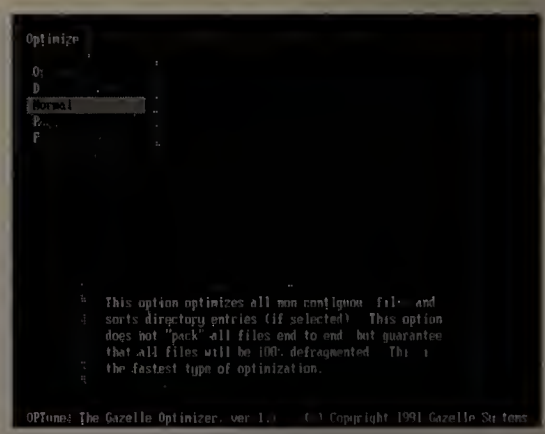
OPTune 1.3

★★½ **PROS:** Fast, very flexible file placement options, surface testing and low-level refresh **CONS**: No free space defrag, fails to find all bad sectors

OPTune delivers most of the optimizing features you need—including high-speed performance. This $100 defragger zoomed into a solid third place—and MFM disk owners get surface testing and low-level format refresh features as well. But while the low-level options are fine, *OPTune*'s surface tester could be a lot more accurate: It missed 60 percent of the surface flaws.

It would also be nice if *OPTune* offered a time-saving space-only defragging strategy—but it doesn't. However, it does provide unusually flexible file placement: You can put files at the front of the disk for faster read access, or at the back of the disk where they have room to grow without fragmenting the nicely packed files at the front. Unfortunately, the sorting process is anything but user-friendly. To engage *OPTune*'s powerful file placement capabilities you'll need to use an ASCII word processor to make line-by-line edits in a large ASCII file.

Toss in mouse support; well-written, context-sensitive help screens; and a good dash of speed, and you've got a winning combination.



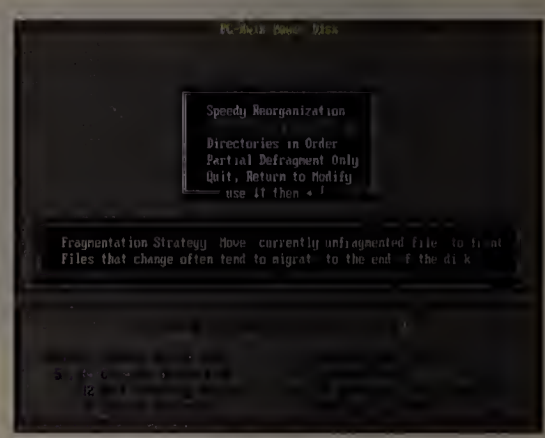
OPTune's on-screen help makes it easy to choose the right defragging strategy.

PC-Kwik Power Disk 1.1

★★½ **PROS**: Very fast, inexpensive, easy to use, full defrag features, automatic file placement **CONS:** No low-level refresh, surface testing missed all bad sectors

If you've got an IDE or SCSI drive and don't want to pay for features you don't need, this $80 high-speed defragger is your smartest buy. You get the best assortment of defragging strategies in the roundup, including space-only defrag. Moreover, *Power Disk*'s supersonic quick defragger blows the doors off the competition. Also, it offers a unique option in quick mode: a file placement strategy that automatically moves fragmented files to the back of the disk (after defragging them, of course) while leaving unfragged files where they are. Hence, EXE and COM files work their way to the front of the disk. You can override the automatic sort to place individual files anywhere you want. However, this requires writing a complicated ASCII file. Otherwise, *Power Disk*'s ease of use is tops.

While the lack of reliable read/write surface testing and low-level refresh will send MFM and RLL users looking elsewhere for their optimizers, IDE, SCSI, and ESDI users will find all the power they need in *Power Disk*, and at a bargain price.



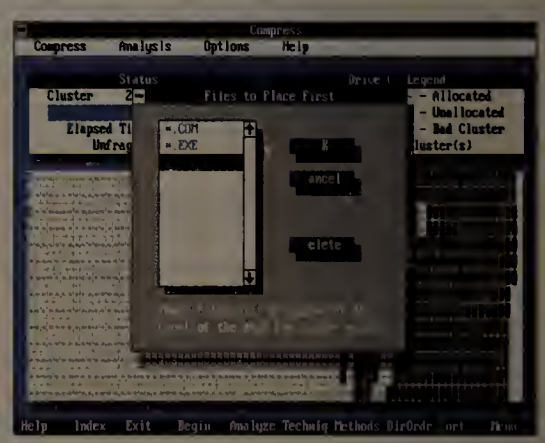
Power Disk's Fragmented Files Last feature maximizes disk performance.

PC Tools 7.1

★★★ **PROS:** Easy to use, free space defrag, low-level refresh and surface testing **CONS:** No safe mode, expensive, misses bad sectors

Year after year, *Norton* and *PC Tools* have been leap-frogging each other to see who can provide the most—and best-designed—hard disk utilities. Like *Norton*, *PC Tools* delivers defragging, surface testing, and low-level refresh capabilities. But unlike *Norton*, it provides no safe operating mode: While Central Point claims that safe mode is the default, we lost several files and two directories during the course of our power-crash test—none of which were recoverable—plus it destroyed one of the DOS partitions. And we have to report that *PC Tools'* surface tester isn't quite as thorough as *Norton*'s: It missed several known bad sectors on our test disk, even in its toughest testing mode.

Like most of the defraggers we looked at, *PC Tools'* Compress lets you select directories and files (by name or extension) and move them to the front of the disk using a menu as your guide. The interface is fully mouse compatible. It's not quite as elegant as *Norton*'s menu interface, but it's just as easy to use. *PC Tools* includes such a great collection of productivity software that you might want to buy it for that reason alone. But given its limitations as an optimizer, you should consider supplementing it with *Norton* or *Power Disk*.



PC Tools makes it easy to put frequently read files at the front of the disk.

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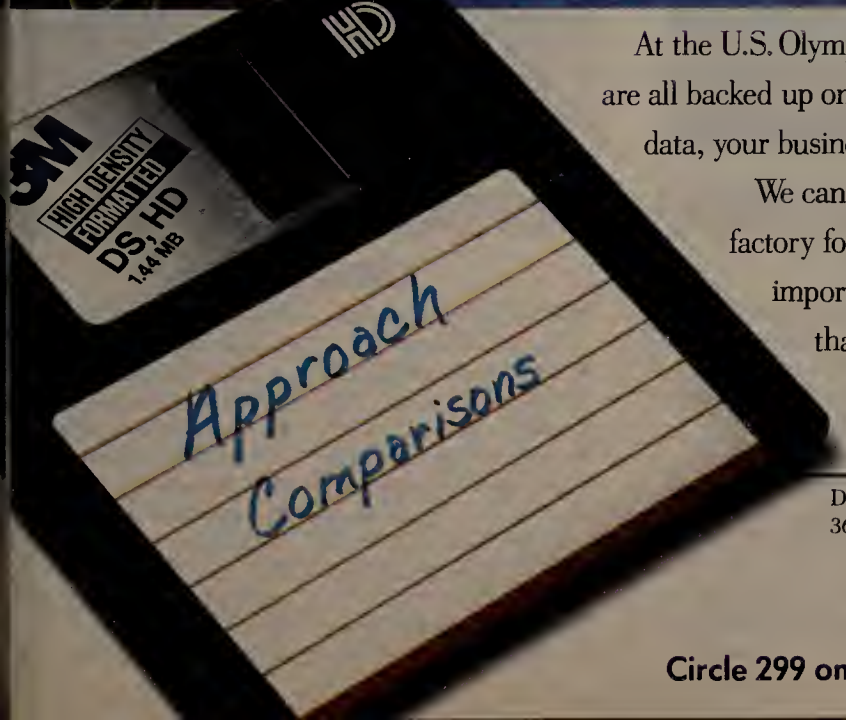

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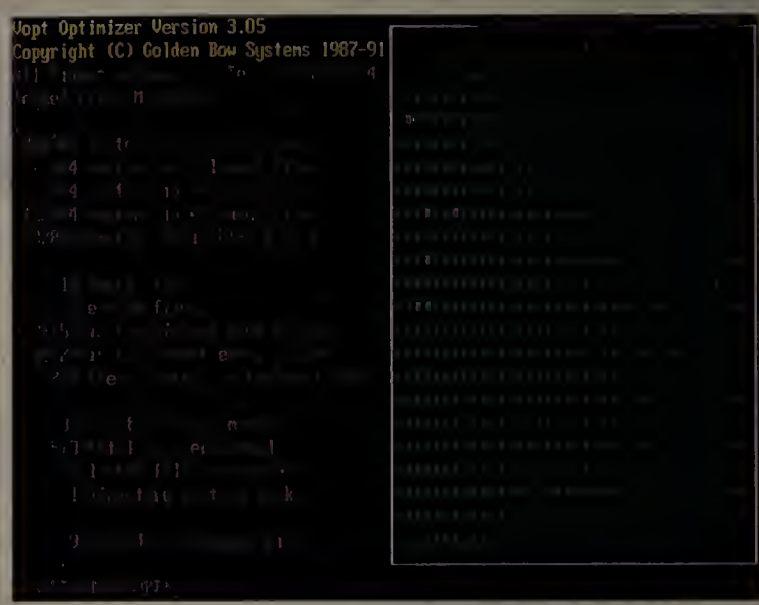
Vopt 3.05

★★ **PROS:** Inexpensive **CONS:** Limited defrag options, misses bad sectors, no menus, no low-level refresh

If you're looking for a low price —$60— and you're willing to settle for a bare-bones defragger, *Vopt* may be just what you want. But there's no low-level formatting capability, no way to move files, and only one defragging strategy: full. All you get is a generic defragger and a surface tester that doesn't work very well. There is some good news, though: Despite the fact that all *Vopt*'s defrags are full, it runs only slightly slower than the other defraggers working in quick mode—as long as you turn off the "safe" option. We wouldn't normally do that, but even with the safe mode off, our pull-the-plug test merely littered the disk with duplicate files that were easily removed using CHKDSK /F. Considering how badly some optimizers mash up your disk when the power fails, this had to be classified as simply annoying.

Finding flawed sectors is another story—a bad one. There's only one level of testing—read only—and it couldn't find a bad sector if it tripped over it. Not one of the known surface flaws was identified. At least the test is mercifully short. And there's no on-screen help—or any other kind of help, for that matter—because *Vopt* has no user interface. It simply runs from the command line. Type **Vopt** and press <**Enter**> to start it up. If you want to turn off the safe mode, type **Vopt /s**. That's the interface, such as it is. *Vopt* will certainly defrag your disk at a very affordable price, but we think you'll prefer one of the other choices.



Vopt runs from the DOS command line, with no interface or on-screen help. But it displays a disk map as it works.

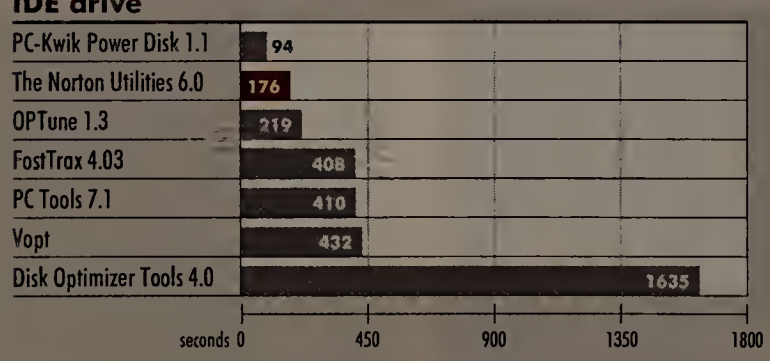
PC WORLD TEST REPORT

Power Disk Speeds to Victory

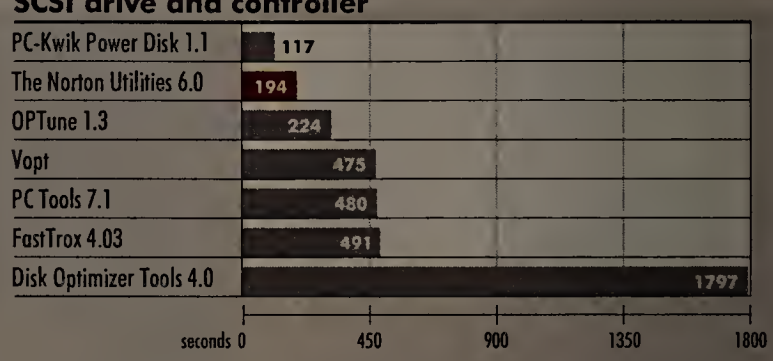
Power Disk defrags faster on all three disk types—but Norton isn't far behind.

BEST BUY

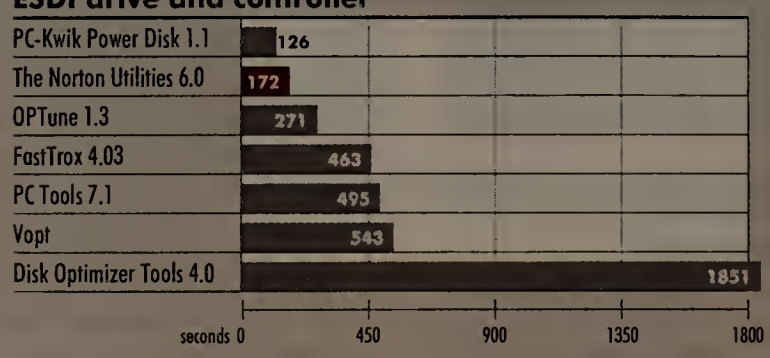
IDE drive



SCSI drive and controller



ESDI drive and controller



Methodology

We performed an identical test sequence with all the utilities on a 33-MHz Dell System 333D PC with 4MB RAM and an ATI Ultra Graphics VGA video card.

The system was configured with 320K of expanded memory. We used a Maxtor LXT340A 320MB IDE drive, a Micropalis 1684-7 330MB SCSI drive with Adaptec cantroller, and a Micropolis 1664-7 330MB ESDI drive with Ultrastor 12F controller. Each drive was divided into an 80MB primary partition and a 240MB or 250MB extended partition with a single logical drive. Both partitions praduced equivalent results. Reparted times are from the 80MB partition tests only.

For our defragmentation tests, we use a batch file to create an identically fragmented file pattern on the 80MB partition of each drive. The pattern comprises 77 percent fragmentation and 25 percent of free disk space. At least 65 percent (approximately 13MB) of the free disk space is contiguous, though the fragmentatian extends beyond the free space to the end of the disk. We then perform a quick defragmentation test, which does not move all the files into a pack at the beginning of the disk. The safe mode is disabled, and defragmentatian is initiated from a DOS batch file, rather than from a menu, for fastest performance.

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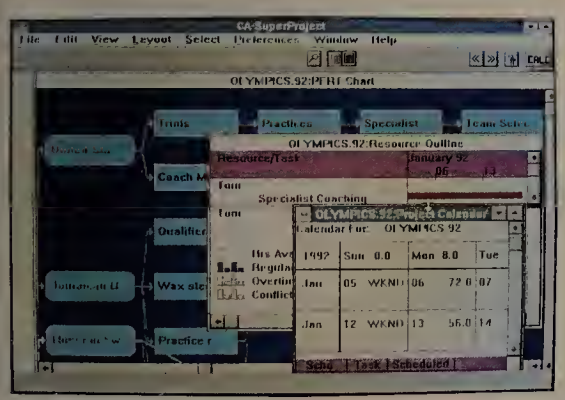

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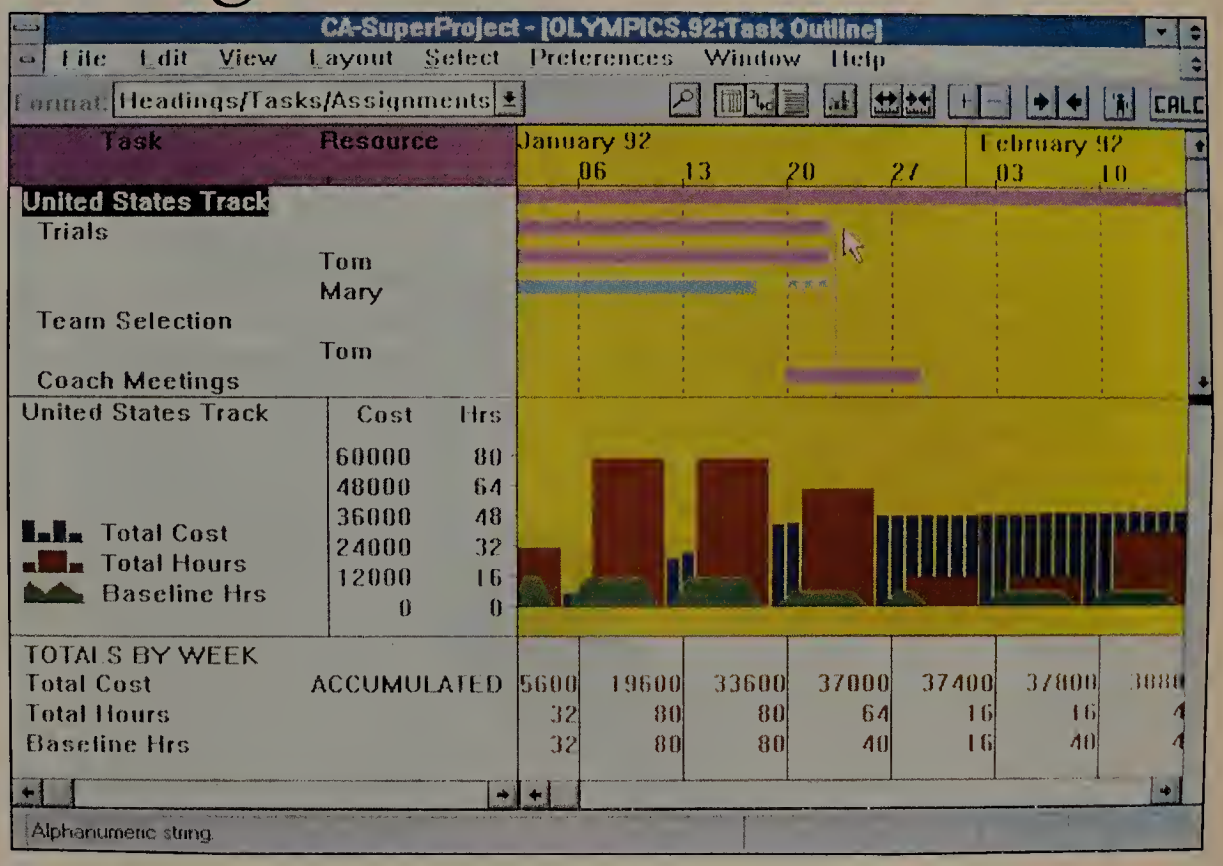

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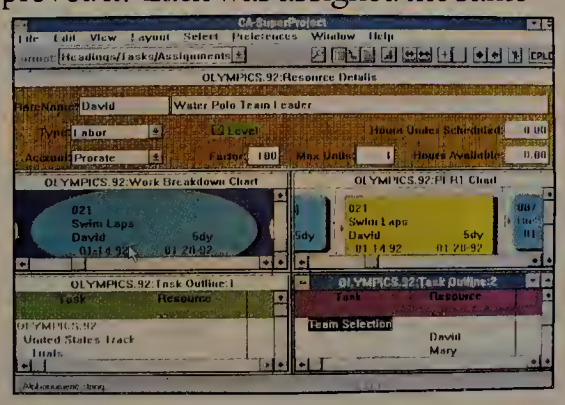

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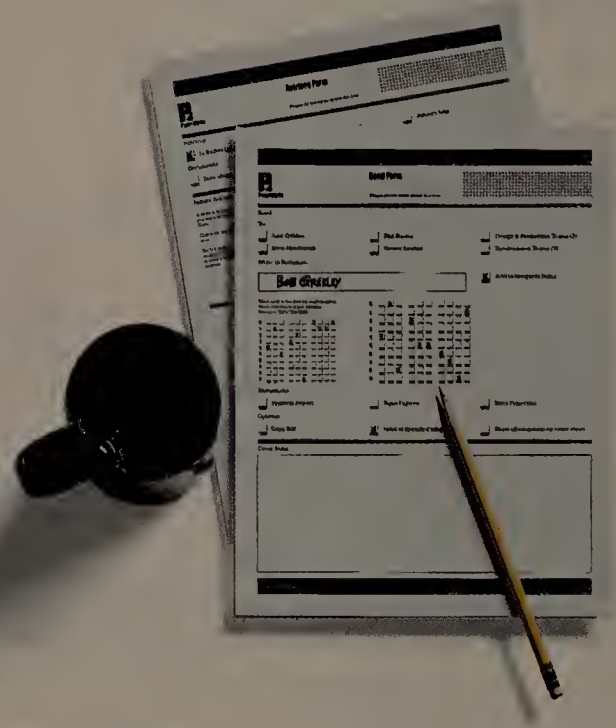

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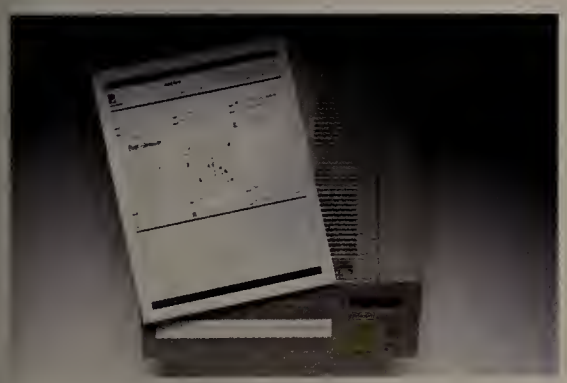

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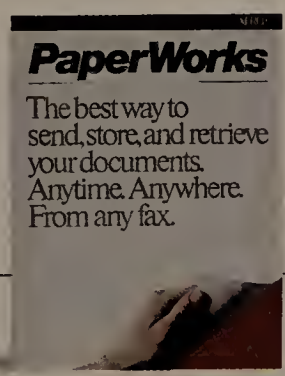

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PAPER WARE

System Requirements: 386SX, 386, 486SX or 486 PC with a mouse and a hard disk with at least 20MB free; 4MB RAM; Windows 3.0 or 3.1 and DOS 3.1 or later; Intel SatisFAXtion, The Complete Fax, The Complete Communicator, or CEI proFAX fax card.

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FEATURES EVALUATION

Speed Your Disk for Optimal Performance

Norton's combination of defragging features, low-level refresh, and surface testing take top optimizing honors—and a Best Buy. For pure defragging, though, PC-Kwik Power Disk is your best choice.

● Yes
○ No
n/a = not applicable

	Disk Optimizer Tools 4.06	FastTrax 4.03	The Norton Utilities 6.01	OPTune 1.3	PC-Kwik Power Disk 1.1	PC Tools 7.1	Vopt 3.05
Standard features							
Price	$49.95	$70	$179	$99.95	$79.95	$179	$59.95
Maximum disk size	unlimited	85MB[1]	unlimited	unlimited	unlimited	unlimited	1GB
Maximum number of files	unlimited	unlimited	10,000	15,000	32,768	12,500	16,378
Expanded memory support	○	●	●	○	○	○	○
Ease of use							
Menu-driven operation	●	●	●	●	●	●	○
Context-sensitive help	●	●	●	●	●	●	○
Mouse support	○	○	●	●	●	●	○
Defrag/surface-testing safe mode	●/n/a	●/n/a	●/●	●/●	●/●	○/○	●/●
Defragmentation features							
Quick defrag (files only)	●	●	●	●	●	●	○
Full defrag (files and free space)	●	●	●	●	●	●	●
Space defrag (free space only)	○	○	●	○	●	●	○
Move selected file to front	●	●	●	●	●	●	○
Move selected file to back	●	●	●	●	●	○	○
Evaluate fragmentation	●	●	●	○	●	●	●
Surface testing							
Read-only	○	○	●	●	●	●	●
Read/write	○	○	●	●	○	●	○
Low-level refresh	●	○	●	●	○	●	○
Service and support							
Warranty	60 days	unlimited	60 days	60 days	90 days	60 days	90 days
Money-back guarantee	●	●	●	●	●	●	●
Toll-free number	○	○	●	●	●	○	○
Daily support (hours)	8.5	24	10	11	11	11	9
Weekend support	○	●	●	○	●	○	○
BBS/fax support	●/●	○/○	●/●	●/●	●/●	●/●	○/●
			BEST BUY				

[1] Worst case; disk size can be increased to 512MB or more by using expanded memory or reformatting to 8K clusters.

WHERE TO BUY

Disk Optimizer Tools 4.06
SoftLogic Solutions, Inc.
800/272-9900,
603/627-9610 (fax)
REQUIREMENTS: 256K,
DOS 2.0 or later version
Reader service no. 738

FastTrax 4.03
FastTrax Int'l
510/525-3510
REQUIREMENTS: 512K,
DOS 2.0 or later version
Reader service no. 739

The Norton Utilities 6.01
Symantec Corp.
800/441-7234,
408/252-3570
REQUIREMENTS: 512K,
DOS 2.0 or later version
Reader service no. 740

OPTune 1.3
Gazelle Systems, Inc.
800/786-3278,
801/373-6933 (fax)
REQUIREMENTS: 256K,
DOS 2.0 or later version
Reader service no. 741

PC-Kwik Power Disk 1.1
Multisoft Corp.
800/759-5945,
503/646-8267 (fax)
REQUIREMENTS: 640K,
DOS 2.0 or later version
Reader service no. 742

PC Tools 7.1
Central Point Software, Inc.
800/445-4208,
503/690-8083 (fax)
REQUIREMENTS: 640K,
DOS 3.0 or later version
Reader service no. 743

Vopt 3.05
Golden Bow Systems
800/284-3269,
619/298-9950 (fax)
REQUIREMENTS: 640K,
DOS 2.0 or later version
Reader service no. 744

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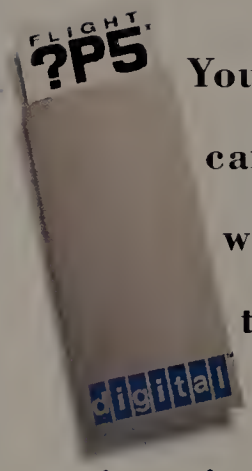

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Display: 14" Monochrome Monitor (resolution 640 x 480)
Video Adapter: SVGA+ (supports up to 1024 x 768, 256 colors)
Keyboard: 101-key enhanced
Mouse: 3-button
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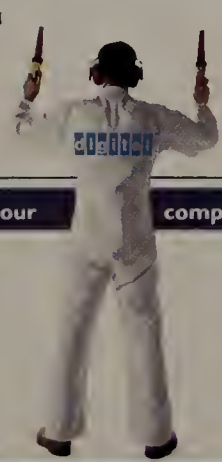
[1]Requires Microsoft Windows, i1386 processor or higher, and 3MB of memory. [2]Requires Microsoft Windows, i1386 processor or higher, and 2MB of memory.



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.....i386 .....i486 .....Other ..... Not Sure
How many applications will your PC(s) run in a typical workday?
How many PCs do you anticipate purchasing over the next 12 months? .....
Are you interested in leasing? .....Yes ..... No
..... Immediately ..... 1 - 3 months
..... 3 - 6 months .....6 - 12 months

What best describes the type of work the system will be used for? (Check all that apply)

O Word Processing
O Database (filing records)
O Retail Store Management
O Education
O Engineering
O Scientific Research
O E-Mail
O Order-entry
O Financial Calculations
O Desktop Publishing
O Design (CAD/CAM)
O Industrial Process Control
O Software Development
O Other industry-specific applications (please specify)

Which of these graphics-oriented applications best describes your needs? (Check all that apply)

O Desktop Publishing O CAD/CAM O Animation
O Realtime Modeling O Image Processing
O AutoCad O Business Graphics

How many people work in your group, department or small business?

O Less than 10 O 10-20 O 20-35 O More

Is your desktop operating system:

O DOS O DOS with Windows O OS/2
O MAC O UNIX™
O VMS O Other

LAN Communication:

How many PCs do you have installed?.....
From how many manufacturers?.....
What kinds of connections does your PC(s) require? (Check all that apply)

O Links with other PCs in the immediate surroundings
O Connection to the local area network (LAN) throughout a buildin
O A line to a host system in a remote location

What kind of media (cable) is used in your LANs today?.....
What is the networking software now being used in your compan
.....

What kind of host system will your PC communicate with?

O Digital O IBM O Other.....

What kind of service do you need?

O On-Site Hardware Support O Software Support
O Telephone Support O Training
O FAX Hotline

How many of your users take portables on the road?
Do you currently have a service contract(s) for your PCs?
O Yes O No
How many?.....
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Backup SOFTWARE

These backup utilities make one of life's little chores a lot easier. Some even back up your hard disk in the background while you work.

Good news. In this roundup of backup utilities we will *not* lecture you on the dangers of neglecting to back up your hard disk. We won't warn you about the dire consequences of losing crucial company data. We're not even going to bore you with statistics like those from the recent study by International Data Corporation (IDC), a market research firm, reporting that hard drive failure accounts for 28 percent of all technical support calls. And we won't preach to you about the scourges of viruses, brownouts, and boneheadedness (such as accidentally erasing a file or reformatting your hard disk). Just to be good sports, we won't even tell you to eat your brussels sprouts.

Chances are you already know you need to back up your data. Spending a few minutes a day to save your work to floppy disk or tape just makes good sense. The real question is, which program should you purchase?

Before you dig into the details, you need to answer two questions: Are you using *Windows?* And do you need to back up to tape? Until recently, you couldn't find a floppy disk backup program that could do either, but in this review of eight leading packages, four run under *Windows* and four can back up to tape. One of our two Best Buys, *Central Point Backup 7.1 for Windows,* can do both.

If you use *Windows,* you'll appreciate the ability to run backups while you're working in other *Windows* applications. The utilities toil quietly in the background, interrupting you only to ask for disks as needed. So there's no need to set aside time at the end of the day to stare idly at a blank screen, waiting for the program to prompt you for another disk.

Tape backups—the standard on network file servers—are

BY DAVID FOGLE

still a bit scarce on workstations; according to IDC, only 5 percent of PC users had a tape drive in 1991. But that number is increasing rapidly; these days you can find tape drives for as little as $200 on the street, and tape is a great way to handle the growing mountain of data accumulating on your hard disk—especially if you're a *Windows* user with a 100MB-plus hard disk. With tape, you don't have to shuffle floppies, and once you set up your backup parameters, backing up is as easy as pressing a key at the end of the day and walking away. Three of the packages we looked at (*Norton Backup 2.0 for DOS*, *Central Point Backup 7.1 for DOS*, and *Central Point Backup 7.1 for Windows*) offer an alternative to software included with many DC2000 tape drives. For information on the software you get with some of the popular QIC-80 and Irwin servo-format drives, see the sidebar "DC2000 Tape Backup: An Affordable Alternative." If your tape drive lets you designate it as a DOS device, you can use any backup program with it—but not at full speed and functionality.

Backup Laid Bare

To find the best of the backup programs, we ran all eight packages through a tough regimen, performing a wide range of daily backups and restores. We did full backups (backing up every file on a drive) with formatted and unformatted disks, incremental backups (backing up only files changed since the last full or incremental backup), and differential backups (backing up changed files without marking them as backed up). We also checked whether a program could compare a backup set's files to data on the hard disk and restore information from partially erased backup disks. Since you don't want to spend extra time waiting to feed in new disks, we also benchmarked each program's performance. Finally, we examined each program for flexibility in backup and restore options (see the sidebar "Buying Smart: The Keys to a Secure Backup" for more details).

Even the most secure error correction won't do much good if a backup program makes choosing files such a chore that it leaves no time for backing up. All of these utilities let you choose files from treelike directory displays or by specifying wild cards, but beyond that, ease of use varies. For example, you have to use a function key to bring up each of *Sytos Plus File Backup Manager 1.32 for DOS*'s file selection screens, and *Distinct Back-Up 2.4 for Windows*' cascading windows slow down the file selection process. Each of these interfaces is more difficult to use than those of the other programs reviewed here.

In the end, we wound up with one DOS and one *Windows* winner: *Norton Backup 2.0 for DOS* and *Central Point Backup 7.1 for Windows* each won a Best Buy. DOS users will appreciate *Norton Backup*'s great data security features, smooth interface, speed, and flexibility, and *Norton Backup* offers an easy entrée for tape users as well.

The *Windows* version of *Central Point Backup 7.1* is the clear winner for users of this popular operating environment. Add *Central Point Backup*'s terrific data security options, speed, and ease of use to its extensive tape support, and you have the backup advantage over any other *Windows* program. And *Central Point Backup*'s speed stands out as an exception to the rule that backups run slower under *Windows* than they do under DOS.

When you look at the current crop of backup utilities, you'll see that they're making your backup chore easier to swallow than ever.

David Fogle is a network engineer for a major computer reseller headquartered in Northern California.

For more information about all products in this article, circle reader service no. 903.

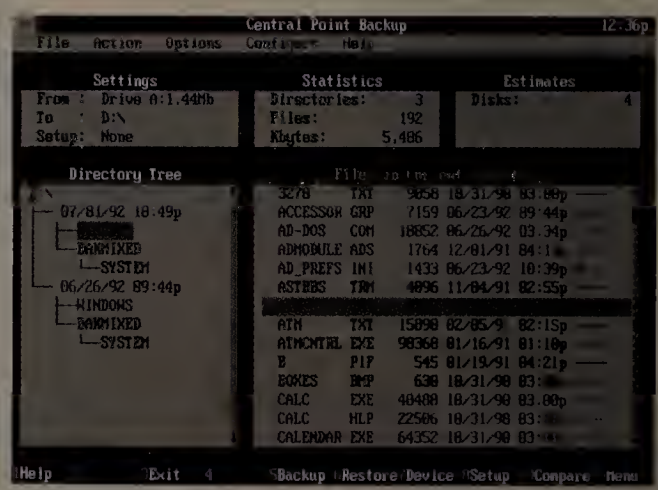
Central Point Backup 7.1 for DOS

★★ ★½ **PROS:** Very fast, easy to use, supports tape drives **CONS:** Displaying and selecting files from large directories can be slow, lacks dedicated tape utilities

The $129 *Central Point Backup 7.1 for DOS* is inexpensive, reliable, fast, and easy to use. (You also receive this program when you purchase Central Point's $179 *PC Tools 7.1*.) Selecting files using the character-based graphical interface is easy—color icons indicate if a subdirectory contains files marked for backup and whether the files were chosen by wild card or manually.

Restoring files with *Central Point Backup 7.1* is a breeze—you simply select the backup set from a scrolling list. Daily backups appear as dated "subdirectories" on a tree, which makes it a snap to track down the files you need by date.

Central Point Backup 7.1 tested fastest at modified backups and restores. However, the program is slow to display files when you're looking through loaded subdirectories. You can back up multiple drives in one session, but you will get a separate set of disks for each drive. And there are no tape utilities for tape status reports, dedicated tape formats, and tape retensioning. Overall, however, speed, dependability, and an easy-to-use interface make *Central Point Backup 7.1* a great choice for DOS users.



Central Point Backup for DOS displays the date of each appended backup.

Buying Smart: The Keys to a Secure Backup

Regular backups are your best data security insurance, but you shouldn't have to pay too high a premium in time. Ease of use is key: Nothing's more frustrating than struggling with an awkward interface when you just want to back up your data and get out the door.

DATA SECURITY

Your backups have to be accurate and restorable even if some disks are damaged, and the program should compare backups with the original files. It should prevent you from accidentally overwriting previous disks and restoring old files over new ones. *Norton Backup 2.0 for DOS* and the two Central Point utilities tied for best security features in the roundup.

EASE OF USE

Flexible, intuitive file selection is essential. All the packages we reviewed let you select files from a directory tree, but not all make it easy. They all offer good documentation, context-sensitive help, and mouse support, and all but *Sytos Plus* let you choose your skill level.

If you often back up from the same directories, you'll want to be able to automate backups using backup sets, which let you save settings for tasks so you don't have to reenter file specs and macros, which let you replay command sequences. *Norton Backup for DOS* was easiest to use.

BACKUP OPTIONS

The ability to automate backups isn't much good if you can't back up exactly what you want. So you need flexible backup options. All these programs let you choose between full, incremental, and differential backups. A full backup copies every file on your drive and resets the archive bit to let DOS know that the file's been backed up. If you change the file, DOS will set the bit to mark the file as modified. Incremental backups copy only files that have been changed since the last full or incremental backup. Differential backups do the same, except incremental backups reset the archive bit and differential backups don't.

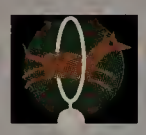
You'll probably want to combine full backups with either incremental or differential modified-file backups to save time and disks. Most users do full backups weekly or monthly, appending daily or weekly modified backups. Some people who repeatedly update a small set of files prefer differential backups because they overwrite the last backup set and use fewer disks. The downside is that as the number of files increases, each backup takes longer. Also, you can't restore one targeted version of a file. If you work with a variety of files, or if restoring a specific version of a file is essential, incremental backups are best.

All the programs reviewed will back up to any logical drive—floppies, another hard disk, a network drive, or removable media. But not all support tape drives, which are faster and easier to use. One 120MB tape holds the same data as 100 1.2MB floppies.

If you use a *Windows* program, you can run backups in the background. All told, Best Buy *Central Point Backup 7.1 for Windows* offers the best backup options in this review.

RESTORE OPTIONS

You'll probably use restore functions much less than backup functions, but when you do, you'll need to be able to recover the right data. The file selection features mentioned above also apply to restore operations, but you'll want special restore options, such as the capability to choose a single file. All the programs warn you before overwriting files on the hard disk. They also let you restore data to new locations —helpful if you need to restore to a hard disk with a different subdirectory structure. The two *Nortons* and *Sytos Plus* provide the most flexible restore options.



PERFORMANCE

Speed is significant, especially if you're unable to back up in the background. We benchmarked four typical tasks: modified backups, full backups, partial restores, and full backups with unformatted disks. Because you'll probably do an incremental backup every day, we weighted that test highest in our evaluation. The full-backup test was also heavily weighted because it's a frequent and time-consuming job. We rated the less common task of restoring files lower and the once-in-a-while full backup while formatting lowest. The two Central Point products virtually tied for fastest overall.

PRICE

All these packages are reasonably priced. They're even cheaper on the street: For example, you can buy each of our $129 Best Buys, *Norton Backup for DOS* and *Central Point Backup for Windows*, for $85 at discount dealers.

SERVICE AND SUPPORT

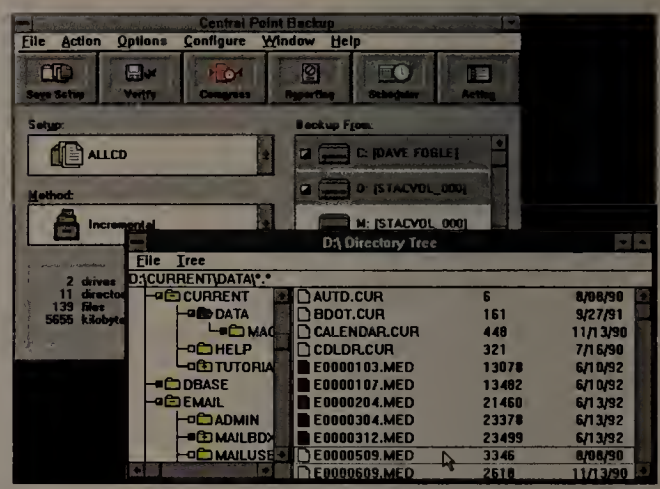
To evaluate technical support, we made three calls to each vendor and asked questions of varying difficulty. We evaluated the accuracy and clarity of the answers and factored in time needed to get an answer, time on hold, and time for a return call. We also considered basic support policies such as toll-free support numbers, extended support hours, and BBS and fax support.

Central Point Back-up 7.1 for Windows

★★★★ **PROS:** Very fast, easy to use, supports tape drives **CONS:** Selecting files from large directories can be slow, lacks dedicated tape utilities

WINDOWS *Central Point Backup 7.1 for Windows*—included with the $129 DOS version and the $179 *PC Tools 7.1*—combines the power and speed of the DOS utility with *Windows'* background processing. The only feature missing is the ability to view a file's contents before backing it up. As its DOS stablemate does, *Central Point Backup for Windows* can automatically check files for viruses.

When backing up in the background, the program prevents you from accidentally saving data to the floppy from a foreground application. The prompt for a new disk is intrusive—instead of beeping, the program pops up a dialog box, demanding an immediate response. Version 7.2, which should be available by the time you read this, will take advantage of *Windows 3.1*'s drag-and-drop file and subdirectory selection and add support for more Irwin tape drives.



Central Point Backup for Windows' colored icons show files selected manually or by wild card.

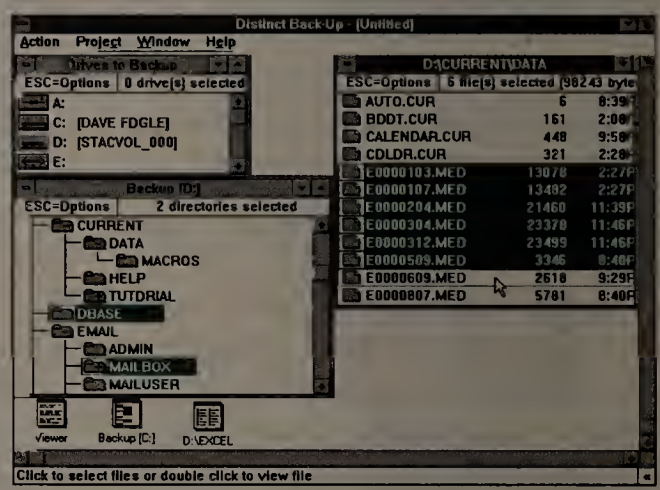
Even without these extras, however, version 7.1 is a Best Buy and your top choice for *Windows* backups.

Distinct Back-Up 2.4 for Windows

★★½ **PROS:** Can append to previous disk set, background backups **CONS:** Slow full backups, doesn't automatically detect inserted floppies

WINDOWS Distinct beat others to the punch in the *Windows* market, but version 2.4 of *Distinct Back-Up* is outboxed by the top contenders. The program is slow, especially with full backups. You get two user levels—both fairly simple—but the more advanced has a quirky interface reminiscent of *Windows 3.0*'s File Manager. Dialog boxes multiply as you delve into subdirectories, and if you leave a subdirectory selected in the tree display, all its files will be selected along with your individual choices.

Menu organization is muddled, and getting to the disk handling options from the file selection screen requires several steps. The $129 *Distinct* doesn't automatically recognize when you've inserted a floppy—you must press a key. The program also neglects to remove the backup drive from the list of valid DOS devices when backing up in the background. Further, you can't restore data from an incomplete backup set, and there's no tape support. Overall, the program's slow, unintuitive operation has moved it well back in the pack.



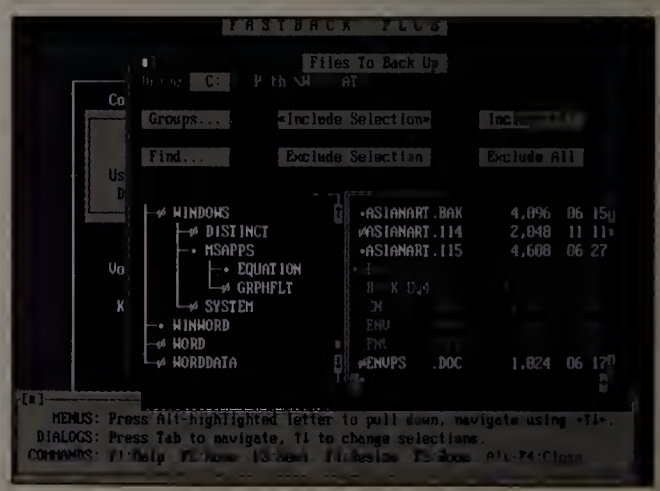
Distinct Back-Up gives you separate windows for selecting drives, subdirectories, and files.

Fastback Plus 3.04 for DOS

★★★ **PROS:** Fast modified backups, can share backup data with Macintosh and Windows versions, good NetWare support **CONS:** No tape support, slow restores

Fastback Plus is the most popular backup program around. Version 3.04's improved reliability, greater flexibility, and easier-to-use interface have brought this veteran back to a competitive stance. Performance is good, with the third fastest modified backups. The program was slower at restoring selected files, however. The $189 *Fastback Plus* offers two features you can't find elsewhere: the ability to back up and restore NetWare bindery and system files, and the knack for restoring backups made with *Fastback II*'s Macintosh version.

The new interface could still use some work: Selecting files or subdirectories from the tree directory is easy, but wild-card selections require the extra step of creating a backup group. *Fastback Plus* is a good choice if you need to share backup data with Macintosh users or if you'll want to back up a small Novell file server with the QIC-40/80 tape support promised in version 3.1. But if you're not already sold on *Fastback*, *Central Point Backup for DOS* and *Norton Backup for DOS* still hold the edge.



Fastback Plus for DOS lets you select entire directories or individual files from one screen.

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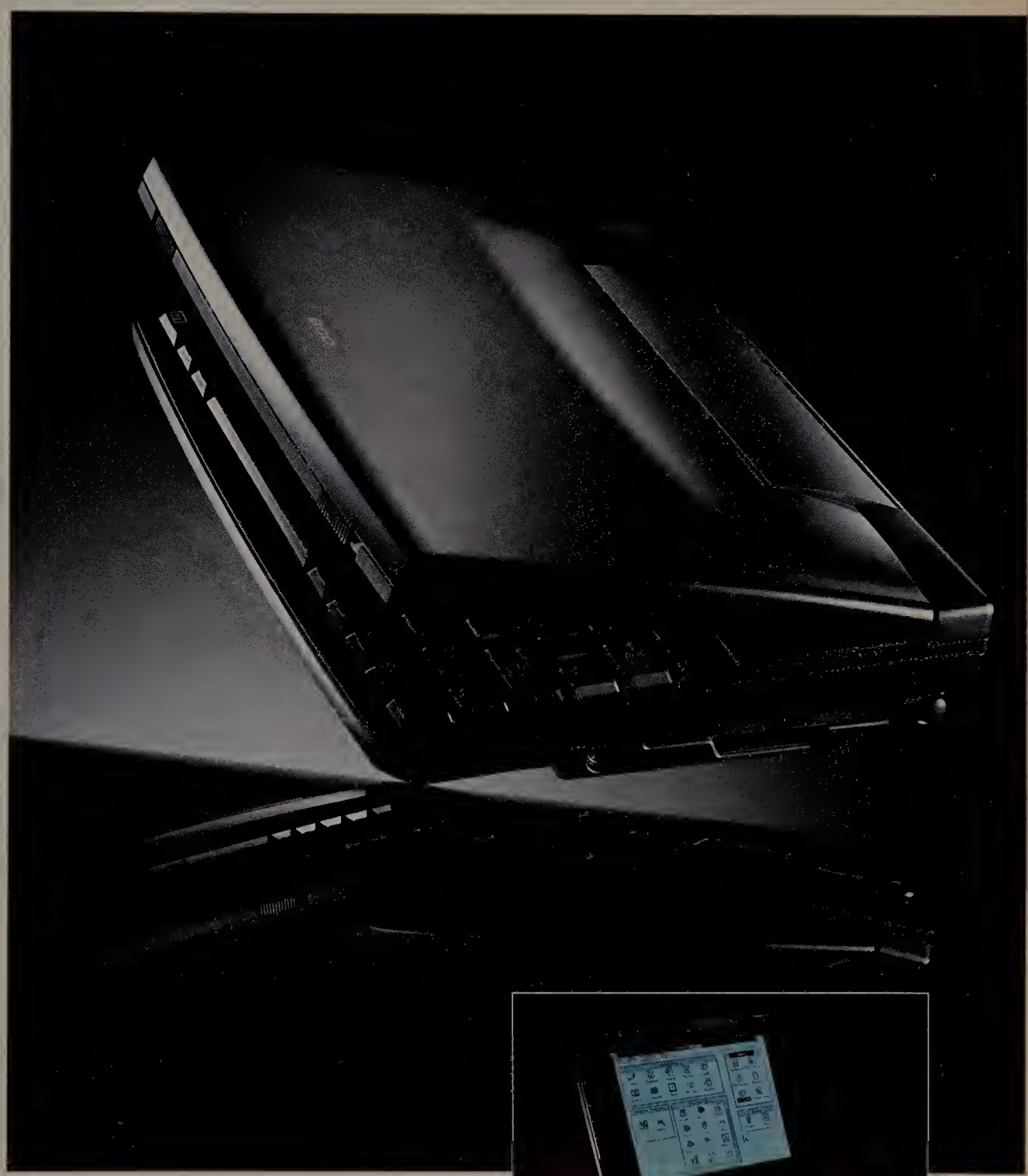

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Fastback Plus 1.0 for Windows

PROS: Fast modified backups, can share backup data with Macintosh and DOS versions, good NetWare support
CONS: No tape support, very slow restores

WINDOWS *Fastback Plus 1.0 for Windows* offers the same $189 price, features, advantages, and drawbacks that *Fastback Plus 3.04 for DOS* does. However, the *Windows* version is a little bit slower than its DOS counterpart, especially when performing full backups and partial restores.

Thanks to *Windows*, you can do backups in the background, but *Fastback Plus* doesn't remove the target floppy drive from the list of valid DOS devices. And when prompting you to insert another disk, *Fastback* pops up its status window and dialog boxes in front of your application, even jerking you out of a full-screen DOS application into *Windows*, where you have to click or key your way back to your work.

File selection is easier in the *Windows* version than in the DOS version: You see a series of icons that differentiate between manually selected, wild-card selected, and deselected files. You can back up multiple drives in a single session, but as with the DOS version, the program creates a separate backup set for each drive. *Fastback Plus for Windows* is a likely choice for *Fastback Plus for DOS* customers who want to tread the path of a graphical user interface, but the *Windows* versions of both *Central Point Backup* and *Norton Backup* offer a smoother road for most users.

Fastback Plus's Include and Exclude buttons select and deselect all files in the current subdirectory.

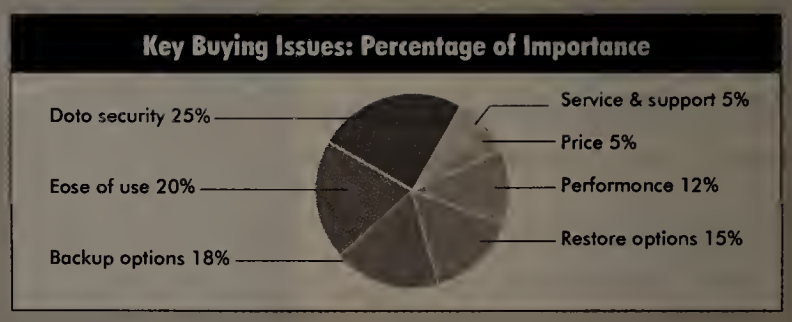
EXECUTIVE SUMMARY

DOS or Windows Backup: Take Your Pick

Norton Backup for DOS and Central Point Backup for Windows make safeguarding your data easy.

PC WORLD BEST BUY

The Best Buy in DOS backup, **Norton Backup 2.0 for DOS** spares no effort to keep your sessions short and sweet, while giving you the flexibility to make copies of just the files you want. Windows users shouldn't feel left out: **Central Point Backup 7.1 for Windows** also gives you an easy path to safety. **Central Point Backup 7.1 for DOS** and **Norton Backup 1.2 for Windows** barely missed winning a Best Buy.



Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Data security	Ease of use	Backup options	Restore options	Performance	Price	Service and support	Overall value
Central Point Backup 7.1 for DOS	669	☆☆☆☆	☆☆☆½	☆☆☆½	☆☆☆½	☆☆☆☆	☆☆☆☆	☆☆☆☆	★★★½
Central Point Backup 7.1 for Windows	669	★★★★	★★★½	★★★★	★★★½	★★★★	★★★★	★★★★	★★★★
Distinct Back-Up 2.4 for Windows	670	☆☆½	☆☆½	☆☆☆	☆☆	☆☆½	☆☆☆☆	☆☆☆½	★★½
Fastback Plus 3.04 for DOS	671	☆☆☆½	☆☆½	☆☆☆	☆☆☆	☆☆☆	☆☆☆☆	☆☆☆☆	★★★
Fastback Plus 1.0 for Windows	671	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆½	☆☆☆☆	☆☆☆☆	★★★
Norton Backup 2.0 for DOS	672	★★★★	★★★★	★★★½	★★★★	★★★½	★★★★	★★★★	★★★★
Norton Backup 1.2 for Windows	672	☆☆☆½	☆☆☆½	☆☆☆	☆☆☆☆	☆☆☆½	☆☆☆☆	☆☆☆☆	★★★½
Sytos Plus File Backup Manager 1.32 for DOS	673	☆☆☆	☆☆	☆☆☆	☆☆☆½	☆☆½	☆☆☆	☆☆☆½	★★★

Overall value is calculated by multiplying each category rating by the category's weight percentage, summing the results, and rounding to the nearest half number.

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Let's face it. Some things in this world were designed for speed. And other things, well, just weren't.

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PacificPage XL	HP PostScript Cartridge
:35	3:37

Time to print average graphics page

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Dutch 801 (Tms Rmn) Zapf Calligraphic 801 (Palatino) ITC Avant Garde®
ITC Bookman® Century Schoolbook *ITC Zapf Chancery®*
ITC Zapf Dingbats® Symbol αβχδεφγηιφκλπ

Each typestyle comes in normal, bold, italic and bold italic treatments except for Chancery, Zapf Dingbats, and Symbol.

PACIFIC DATA
PRODUCTS

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DC2000 Tape Backup: An Affordable Alternative

Most of these tape drives can also be used with Central Point Backup or Norton Backup 2.0 for DOS.

	Alloy Computer Products	Backtrax	Colorado Memory Systems	Core Int'l	Everex Systems
Standard features					
List price for drive and software	$525	$379	$350	$350	$359
Tape format	QIC-80	QIC-80	QIC-80	QIC-80	QIC-80
Drive	Retriever 250c	Backtrax Phantom-250	Jumbo 250	CoreTape Light	Excel 120F
Software	ResQ120	1.04 (ER20)	Jumbo Tape 2.50	CoreTape Light 2.0	FTape 3.0
RAM required	256K	384K	320K	256K	640K
Multiple user levels	N	N	N	N	Y
Context-sensitive help	Y	N	Y	Y	Y
Mouse support	Y	N	N	N	N
Data security					
Restores from incomplete backup set	N	N	N	Y	N
Compares backup with original	Y	N	Y	Y	Y
Warns before overwriting backup set	Y	N	Y	Y	Y
Warns against replacing newer file	Y	N	Y	Y	Y
Can ignore hidden files	Y	Y	Y	Y	Y
Password protection	Y	Y	Y	Y	Y
Manages backup sets	Y	N	Y	Y	Y
Encryption	N	N	N	Y	N
Backup options					
Select directories/files from tree display	Y	Y	Y	Y	Y
Select files by wild card: include/exclude	Y/Y	Y/Y	Y/Y	Y/Y	Y/Y
Select files by date range	Y	Y	Y	Y	Y
Select files by attribute	Y	N	N	Y	Y
File list shows size, date, and time	Y	Y	Y	Y	Y
Estimates time/space required	Y/Y	N/N	Y/Y	Y/Y	Y/Y
Data compression	Y	Y	Y	Y	Y
Multiple drives in same backup	[2]	N	N	Y	Y
Differential backup	Y	N	Y	Y	Y
Formats tape during backup	N	N	N	N	Y
Can automate backup	Y	Y	Y	Y	Y
Can back up in background	n/a	n/a	n/a	n/a	N [3]
Restore options					
Restore files to different drive/directory	Y	Y	Y	Y	Y
Restore subdirectories under new name	Y	N	Y	Y	Y
Select directories/files from tree display	Y	N	Y	Y	N
Select files by wild card: include/exclude	Y/Y	Y/Y	Y/Y	Y/Y	Y/Y
Select files by date	Y	Y	Y	Y	Y
Supports Quick File Access	N	N	Y	Y	Y

n/a = not applicable

[1] Includes separate utility for function.
[2] Must use macro.
[3] Can format in background.
[4] In Windows version.

WHERE TO BUY

Alloy Computer Products Inc.
One Brigham St.
Marlboro, MA 01752
800/800-2556,
508/481-7711 (fax)
Reader service no. 674

Backtrax
21800 Oxnard St. #700
Woodland Hills, CA
91367
800/669-3506,
818/704-7733 (fax)
Reader service no. 675

Colorado Memory Systems Inc.
800 S. Taft Ave.
Loveland, CO 80537
303/669-8000,
303/669-0401 (fax)
Reader service no. 676

Core Int'l Inc.
7171 N. Federal Hwy.
Boca Raton, FL 33487
407/997-6055,
407/997-6009 (fax)
Reader service no. 677

Everex Systems
48431 Milmont Dr.
Fremont, CA 94538
800/628-3837,
510/498-1111 (fax)
Reader service no. 678

Maynard Electronics	Maynard Electronics	Mountain Network Solutions	Tallgrass Technologies	Tecmar	Wangtek
$479	$499	$795	$995	$519	$499
Irwin servo	QIC-80	QIC-80	QIC-80	QIC-80	QIC-80
Irwin AccuTrak Plus Series	ArchiveXL 120/250	FileSafe 8000Plus	FS300i/High Speed	MiniVault 250	Model 3080
EzTape 3.0 for Windows	QICstream 2.0	FileSafe 5.25	FileSecure 1.53	MiniVault 1.41	Central Point Backup 7.1
2MB	384K	512K	384K	420K	530K
N	N	N	N	N	Y
Y	Y	Y	Y	Y	Y
Y	N	N	N	N	Y
Y	N	[1]	Y	N	Y
Y	N	Y	Y	Y	Y
Y	Y	Y	Y	Y	Y
Y	N	Y	N	Y	Y
Y	Y	Y	Y	Y	Y
Y	Y	Y	Y	N	Y
Y	N	N	Y	N	Y
Y	N	N	N	N	N
Y	Y	N	Y	Y	Y
Y/Y	Y/Y	Y/Y	N/N	Y/Y	Y/Y
Y	Y	Y	N	Y	Y
Y	Y	Y	Y	Y	Y
Y	Y	Y	Y	Y	Y
Y/Y	N/Y	Y/Y	Y/Y	N/Y	Y/Y
Y	Y	Y	Y	Y	Y
Y	N	N	N	N	Y
Y	Y	Y	Y	N	Y
N	Y	Y	Y	N	Y
Y	Y	Y	Y	Y	Y
Y	n/a	n/a	n/a	n/a	Y [4]
Y	Y	Y	Y	Y	Y
Y	N	N	N	Y	Y
Y	Y	N	Y	Y	Y
Y/Y	Y/Y	Y/Y	N/N	Y/Y	Y/Y
Y	Y	Y	N	Y	Y
N	Y	Y	Y	Y	Y

For more information about all products in this sidebar, circle reader service no. 904.

Maynard Electronics
36 Skyline Dr.
Lake Mary, FL 32746
800/821-8782,
407/263-3555 (fax)
Reader service no. 679

Mountain Network Solutions Inc.
240 E. Hacienda Ave.
Campbell, CA 95008-6623
800/458-0300,
408/379-4302 (fax)
Reader service no. 680

Tallgrass Technologies Corp.
11100 W. 82nd St.
Lenexa, KS 66214
800/825-4727,
913/492-2465 (fax)
Reader service no. 681

Tecmar
6225 Cochran Rd.
Solon, OH 44139
216/349-0600,
216/349-0851 (fax)
Reader service no. 682

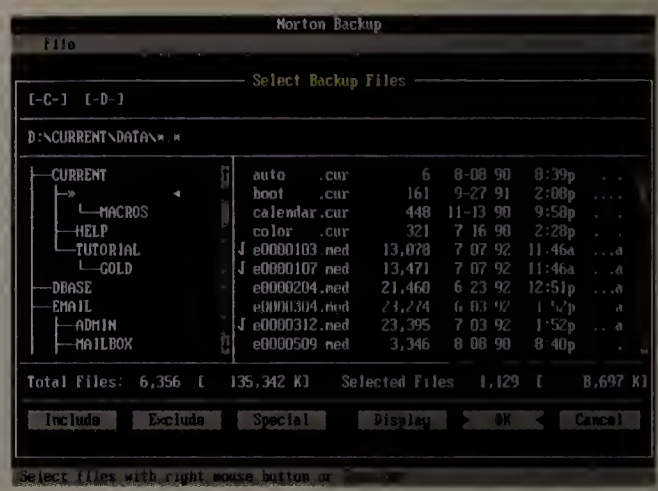
Wangtek Inc.
41 Moreland Rd.
Simi Valley, CA 93065
805/583-5255,
805/583-8249 (fax)
Reader service no. 683

Norton Backup 2.0 for DOS

★★★★ **PROS:** Superb interface, tape support, fast full backups **CONS:** Can't append to existing backup disk, can't restore from incomplete set, slow modified backups

Symantec's $129 *Norton Backup 2.0 for DOS* loads a wealth of abilities into a package that's a breeze to install and use. Multiple-drive backups require just one backup set per session. What's more, you can back up to QIC-40/80 tape drives or from a LAN. In the program's graphical interface mode, a variety of icons represent different file types, subdirectories, and drives. The tree directory makes selecting files easy; files excluded by wild card are marked with different icons from manually marked files.

The program can automatically run *Norton Disk Doctor* each time you back up, and you can view file contents before backing up. We noted a few minor flaws: You can't append backup sets to the last disk of a previous backup set, and you can't continue a restore after skipping a disk. Although full backups were the fastest, modified backups were the second slowest. Still, considering its features and ease of use, this *Norton Backup* is a clear Best Buy for the DOS user.



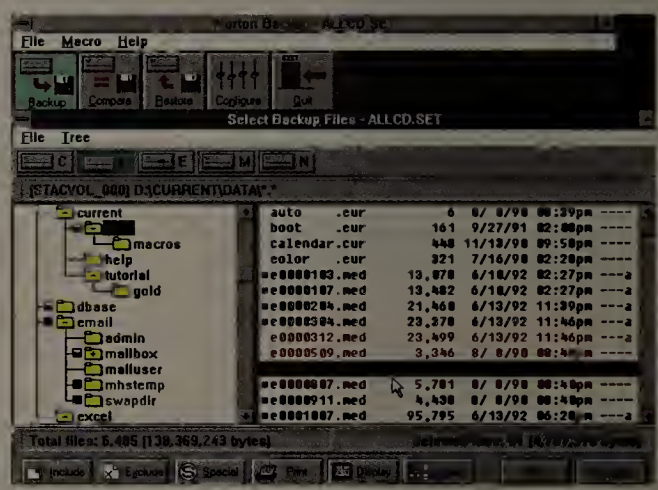
Norton for DOS's Include and Exclude buttons and selection indicators make backups a snap.

Norton Backup 1.2 for Windows

★★½ **PROS:** Easy to use, excellent for background backups **CONS:** No tape support, can't append to an existing backup disk

WINDOWS The $129 *Norton Backup 1.2 for Windows* we reviewed is a version behind its DOS sibling, but it still provides a great interface to an excellent features set. You can't beat its standard for unobtrusive background operation. Rather than popping up in an application, it simply beeps and waits for you to replace the disk. After a polite wait, the program displays a message but refrains from intruding on full-screen DOS applications. *Norton Backup for Windows* also prevents your other applications from saving files to the backup disk during background backups. Unfortunately, its lack of tape support and missing password protection keep it from matching its DOS sibling and exclude it from the Best Buy winner's circle.

By the time you read this, version 2.0 will be shipping. Symantec says it will equal the DOS product feature for feature, including password protection and QIC-40/80 tape support. If *Norton Backup 1.2 for Windows* had those two features, its adroit handling of background backups would have won us over.



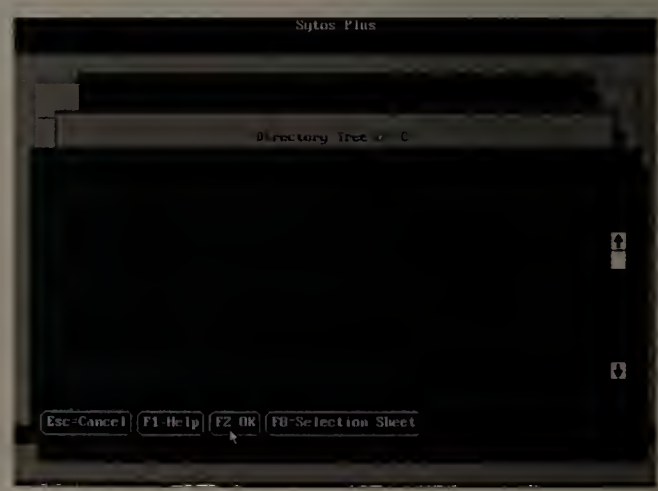
Your options in Norton for Windows are right in front of you, represented by color-coded icons.

Sytos Plus File Backup Manager 1.32 for DOS

★★★ **PROS:** Supports 4mm DAT and 8mm helical-scan tape formats **CONS:** Awkward file selection, doesn't automatically detect inserted floppies, slow performance with floppies, no QIC-40/80 support, only one skill level

Seasoned tape practitioner *Sytos Plus File Backup Manager* does a nice job with tape, letting you easily archive unused data files from your hard disk to the backup medium, append backups, and manage several backup sets per tape (or disk). If you want to add high-capacity tape to your floppy repertoire, *Sytos Plus* is your only choice, as it supports many DC600 QIC, 4mm DAT, and 8mm helical-scan drives (it doesn't support QIC-40/80 drives, however).

But *Sytos Plus* is a novice when it comes to floppies. The program doesn't automatically detect the insertion of a floppy, and although its speed is decent overall, full backups with format were slow. Other weaknesses include the need to run a separate compare step. To back up single files from different subdirectories, you have to rummage through selection screens, manually requesting file lists. At $225, *Sytos Plus* is a good deal only if you need to back up to full-size QIC, DAT, or 8mm.



Sytos Plus's selection screens are clear, but displaying a file listing takes multiple keystrokes.

DOS, Windows Backup Programs With All the Right Stuff

What's new in backup? Windows multitasking and tape support are hot—and Best Buy Central Point Backup 7.1 for Windows offers both. Norton Backup 2.0 for DOS tends to business and also wins a Best Buy.

● Yes
○ No
◒ Deficient
n/a = not applicable

	Central Point Backup 7.1 for DOS	Central Point Backup 7.1 for Windows	Distinct Back-Up 2.4 for Windows	Fastback Plus 3.04 for DOS	Fastback Plus 1.0 for Windows	Norton Backup 2.0 for DOS	Norton Backup 1.2 for Windows	Sytos Plus File Backup Manager 1.32 for DOS
Standard features								
List price	$129	$129	$129	$189	$189	$129	$129	$225
RAM required	640K	2MB	640K[1]	640K	1MB	512K	1MB	640K
Multiple user levels	●	●	●	●	●	●	●	○
Data security								
Restores from damaged disk	●	●	●	●	●	●	●	●
Restores from incomplete backup set	●	●	○	●	●	●	○	●
Compares backup with original	●	●	●	◒[2]	◒[2]	●	●	○
Warns before overwriting disk/newer file	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
Prevents other applications from using floppy during backup	n/a	●	○	n/a	○	n/a	●	n/a
Can include/exclude hidden files	●	●	◒[3]	●	●	●	●	◒[4]
Password-protects backup/encryption	●/○	●/●	●/●	●/●	●/●	●/●	○/○	●/●
Backup options								
Select directories/files from tree display	●	●	●	●	●	●	●	●
Select files by wild card	●	●	●	●	●	●	●	●
Select files by date range	●	●	●	●	●	●	●	●
Select files by attribute	●	●	○	●	●	●	●	○
File list shows size, date, and time	●	●	●	●	●	●	●	●
View data files before backup	●	●	●	○	○	●	●	○
Estimates time and number of disks required	●	●	●	●	●	●	●	◒[5]
Data compression	●	●	●	●	●	●	●	●
Multiple drives in some backup	◒[6]	◒[6]	●	◒[6]	◒[6]	●	●	●
Appends incremental backup to same disk	●	●	●	●	●	●	○	●
Can automate backup	●	●	●	●	●	●	●	●
Can back up in background	○	●	●	○	●	●	●	○
Unobtrusive disk-change prompts	n/a	●	○	n/a	○	n/a	●	n/a
Automatically recognizes floppies	●	●	○	●	●	●	●	○
Backs up to tape drives	●	●	○[7]	○[7]	○[7]	●	○[7]	●
Restore options								
Restore files to different drive/directory	●	●	●	●	●	●	●	●
Restore subdirectories under new name	◒[8]	◒[8]	◒[8]	◒[9]	◒[9]	●	●	●
Select directories/files from tree display	●	●	●	●	●	●	●	●
Select files by wild card	●	●	●	●	●	●	●	●
Select files by date	●	●	○	●	●	●	●	●
Service and support								
Unlimited free support	●	●	●	●	●	●	●	●
Toll-free number	○	●	○	●	●	●	○	○
Daily support (hours)	11	11	9	24	24	10	10	10.5
On-line support	●	●	●	●	●	●	●	○
Fax support	●	●	●	○	○	●	●	●
		BEST BUY				BEST BUY		

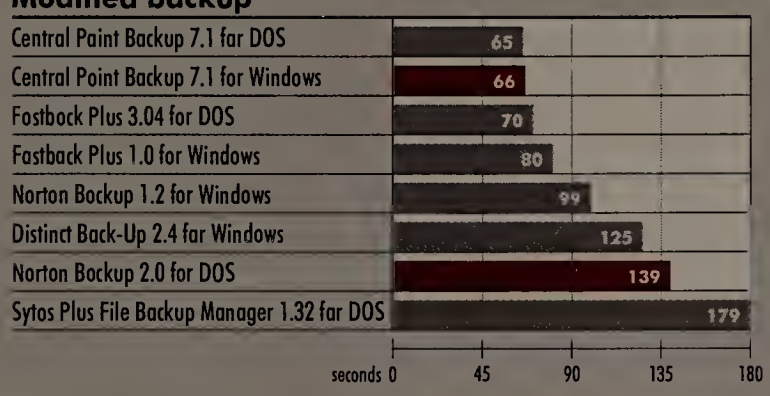
[1] 640K for real mode, 1MB for standard mode, and 2MB for 386-enhanced mode.
[2] Doesn't compare restored version to backup.
[3] Cannot include/exclude system files.
[4] Must be manually deselected.
[5] Separate preview step.
[6] Makes separate sets.
[7] DOS devices only.
[8] Done one at a time using restore path.
[9] Done one at a time using base path.

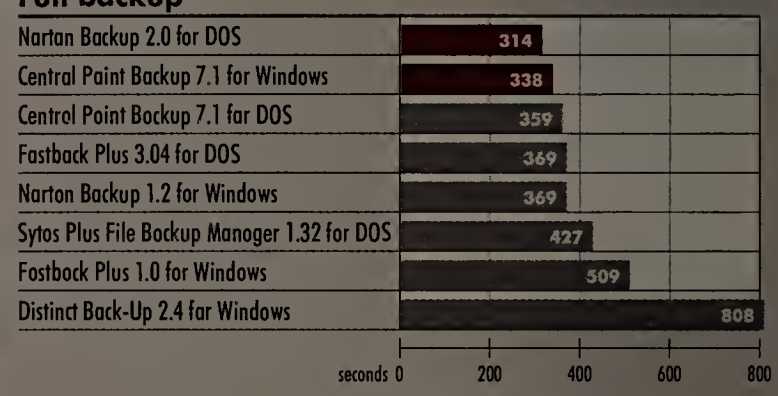
PC WORLD TEST REPORT

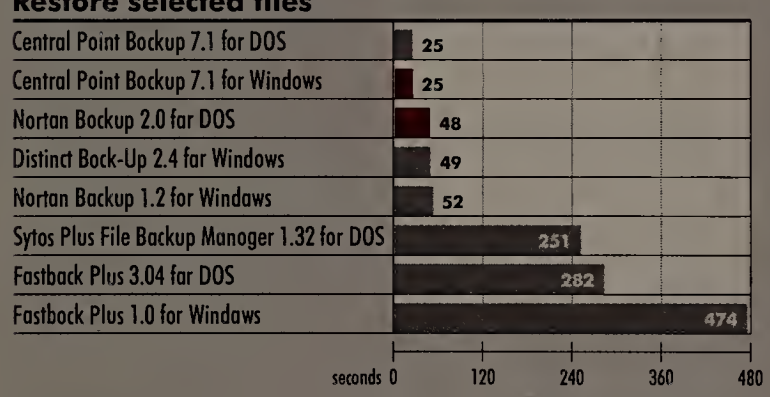
Central Point and Norton Back Up in No Time

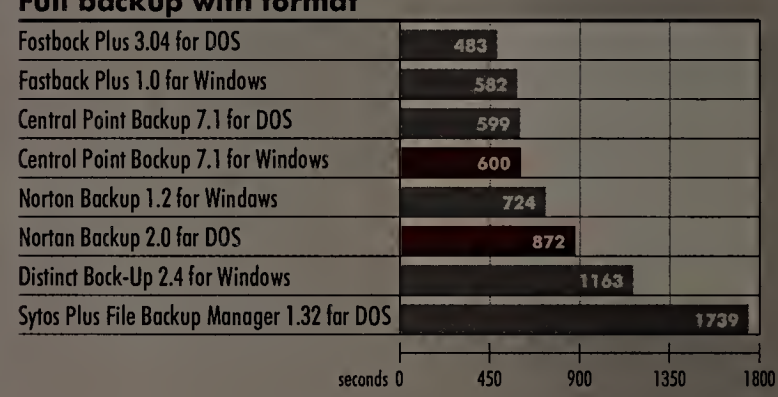
Central Point Backup 7.1 for DOS and its Best Buy Windows sibling are the fastest overall, with sizzling modified backups. Best Buy Norton Backup 2.0 for DOS turns in the fastest score on the full-backup test.

BEST BUY









Methodology
We tested all programs on an IBM PS/2 Model 80 with 4MB RAM and a 115MB hard disk running DOS 5.0 and Windows 3.0. We did the two full-backup tests without data verification and the modified-backup and restore tests with data verification. If a program locked the data verification feature, we did a separate verify pass and added the time to the total. We measure all times from when we launch a process until it's completed, except in the two full-backup tests, where we add 5 seconds for swapping time every time the program requests a new disk.

Modified backup
We reset the archive bit on 119 files (1MB of data) in two subdirectories to mark them as modified and back up those files.

Full backup
We select a combination of 1256 word processing, worksheet, data base, and program files totaling 13MB and spanning two hard drives and several subdirectories. We set programs to overwrite disks without generating warning messages, use the standard DOS format, provide the highest level of error correction available, and use the fastest data compression method available. Each utility automatically uses the fastest DMA (direct memory access) method possible.

Restore selected files
We select 15 Excel worksheets (576K of data) located in one subdirectory and restore them.

Full backup with format
We run a full backup with the program set to format disks while backing up.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

WHERE TO BUY

Central Point Backup 7.1 for DOS, Central Point Backup 7.1 for Windows
Central Point Software, Inc.
800/445-4208,
503/690-8083 (fax)
LIST PRICE: $129 (includes DOS and Windows versions)
REQUIREMENTS: DOS version 640K RAM, Windows version 2MB RAM; DOS 3.0 or later version
Reader service no. 669

Distinct Back-Up 2.4 for Windows
Distinct Corp.
408/741-0781,
408/741-0795 (fax)
LIST PRICE: $129
REQUIREMENTS: real mode 640K RAM, standard mode 1MB RAM, 386-enhanced mode 2MB RAM; DOS 3.1 or later version
Reader service no. 670

Fastback Plus 3.04 for DOS, Fastback Plus 1.0 for Windows
Fifth Generation Systems, Inc.
800/873-4384,
504/295-3268 (fax)
LIST PRICE: $189 each
REQUIREMENTS: DOS version 640K RAM, Windows version 1MB RAM (2MB recommended); DOS 3.0 or later version
Reader service no. 671

Norton Backup 2.0 for DOS, Norton Backup 1.2 for Windows
Symantec Corp.
800/441-7234,
408/252-3570
LIST PRICE: DOS version $129, Windows version $129
REQUIREMENTS: DOS version 512K RAM, Windows version 1MB RAM; DOS 3.1 or later version
Reader service no. 672

Sytos Plus File Backup Manager 1.32 for DOS
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508/898-0100,
508/898-2677 (fax)
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REQUIREMENTS: 640K RAM, DOS 3.0 or later version
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The program's powerful features include automatic line routing and automatic text centering inside shapes. The multi-level charting ability, 270 output device options and unparalleled support for desktop publishing and graphics packages have helped position EasyFlow as the DeskTop Flowcharting tool of choice with corporate managers.

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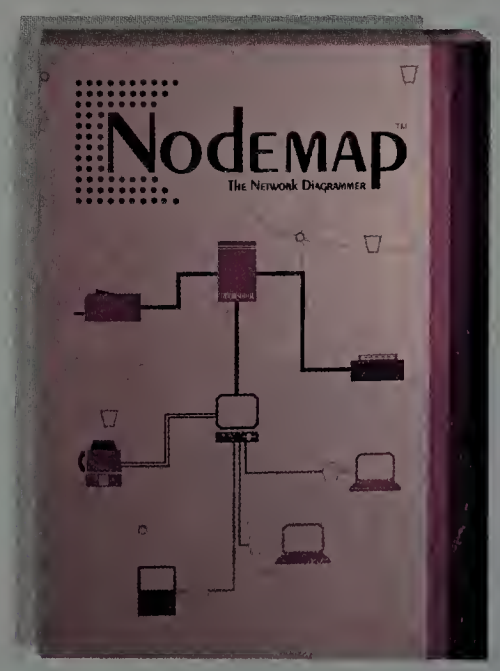

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3629 ▣Design Your Own Home-Architecture 3.0 49.
AddStor ... NCP
4090 ▣SuperStor 2.0 ... 79.
Adobe Systems ... NCP
7547 ▣Adobe Type Manager 2.0 for Windows 65.
6591 ☐Adobe Illustrator 4.0 for Windows ... 399.
5988 ☐Adobe Illustrator Competitive Upgrade 189.
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Aldus ... NCP
8000 ☐Persuasion 2.1 for Windows ... 329.
1341 ☐FreeHand 3.0 for Windows ... 395.
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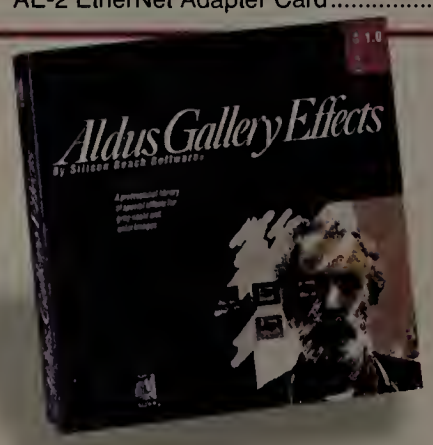
6223 ☐Gallery Effects for Windows ... 139.
Alpha Software ... NCP
5104 ▣Alpha FOUR 2.0 ... 329.
Application Techniques ... NCP
1214 ▣Pizazz Plus 3.0 ... 79.
Approach Software ... NCP
6598 ▣Approach 1.0 for Windows. *intro. price* 139.
Ares Software ... NCP
6030 ▣FontMonger 1.0 for Windows ... 95.
Artisoft ... NCP
2455 Lantastic AE-2 EtherNet Starter Kit 4.1 *(incl. software, 2 EtherNet cards, cable)* 479.
2452 AE-2 EtherNet Adapter Card ... 199.



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6213 ☐*Gallery Effects for Windows*—Produce vivid, sophisticated art from both gray-scale & color images. Comes with 16 master effects including, charcoal, chalk, fresco, ripple, splatter & watercolor ... **$139.**

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▣Type Essentials 1.0 *(all others)* ... *ea.* 69.
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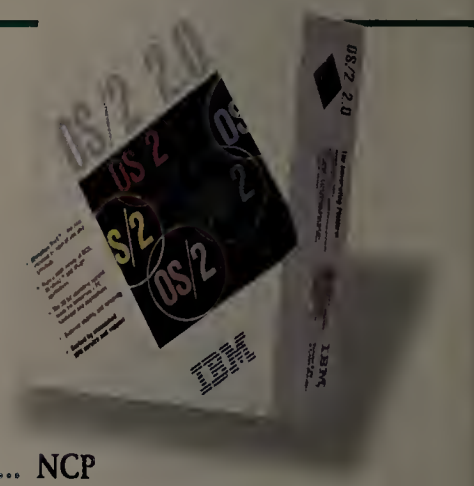
6575 ▣R & R Relational Report Writer 4.0 ... 159.
Contact Software ... NCP
1625 ▣Actl 2.1 ... 229.



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6188 Ⓡ FoxPro 2.0 ... 479.
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Gibson Research ... NCP
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Hayes ... NCP
7983 ▣Smartcom EXEC 2.1 ... 75.
Helix Software ... NCP
9627 ▣Netroom 2.1 ... 52.
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IBM ... NCP
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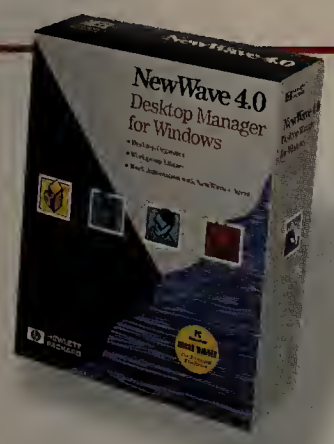

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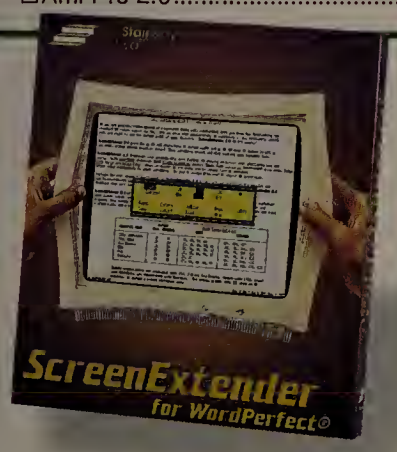
6230 ☐ 1-2-3 Windows/Freelance Double Up Upgrd. 199.
5799 ☒ Ami Pro 2.0 ..... 299.



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6430 ☐ *Screen Extender 2.0 for WordPerfect*—"#1 WordPerfect Add-On", *WordPerfect Magazine* (5/92). Displays the entire width of your document & shows subscript, *italics*, underline, ~~strikeout~~, & other attributes while editing **$59.**

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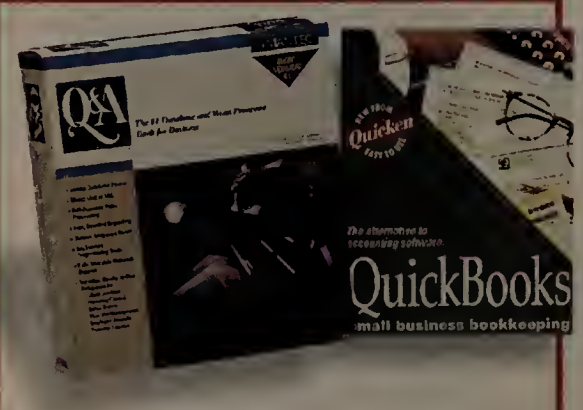
4388 ☐ SimAnt from Maxis ..... 39.
4411 ▣ SimEarth for Windows from Maxis ..... 45.



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3425 ☐ *Symantec Small Business Bundle*—Buy *Q&A* 4.0 & receive a free copy of *QuickBooks*, Intuit's powerful accounting software for non-accountants. *Q&A* includes an easy-to-use data-base & word processor. **$249.**

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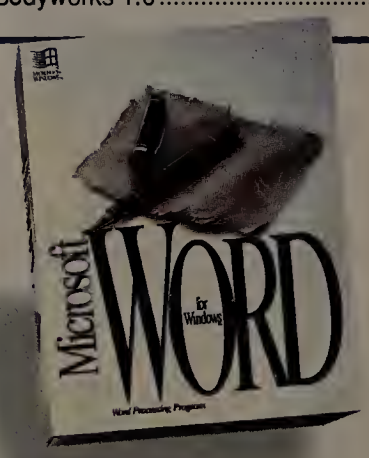

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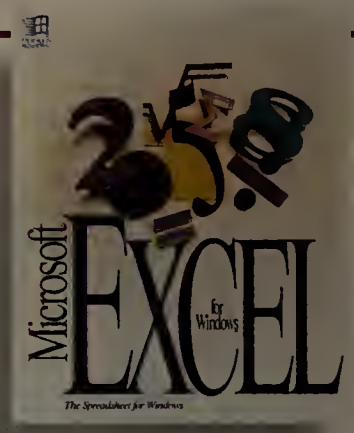
2469 Thumbelina PC ..... 62.
2480 MousePen Pro PC ..... 62.



Microsoft ... NCP
2856 ☐ *Excel 4.0 for Windows*—Includes more powerful tools than ever before with smart features like Drag and Drop, Autofill, Scenario Manager, improved presentation tools, and Help for *Lotus 1-2-3* Users **$299.**

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9620 9600etc/e Modem ..... 369.
3902 Stereo•F/X *(sound board)* ..... 145.
3900 VGA Stereo•F/X *(w/512K, upgrd. to 1 MB)* 279.
Boca Research ... 5 years
7150 BOCARAM/AT PLUS *(2 MB)* ..... 189.
7139 *(4 MB)* ..... 279. 7138 *(8 MB)* ..... 459.
6998 I/O Board for AT ..... 49.
6999 I/O Board for Microchannel *(S/S/P)* ..... 89.
8380 BasicVGA *(256K, 640 x 480)* ..... 49.
8381 SuperVGA *(1 MB, 1024 x 768)* ..... 115.
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2502 2400 Baud Internal Modem ..... 49.
4001 2400 Baud External Modem ..... 59.
Bravo Communications ... 2 years
7400 2 Position Laser Compatible Switch Box 109.
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Curtis ... lifetime
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7358 Command Center SPF-4 ..... 89.
Cyrix Corporation ... 5 years
MATH COPROCESSORS
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9876 FasMath 83D87-33 ..... 169.
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7158	Pacific Page PE *(LJ IID, IIP, III, IIID, IIIP)*	299.
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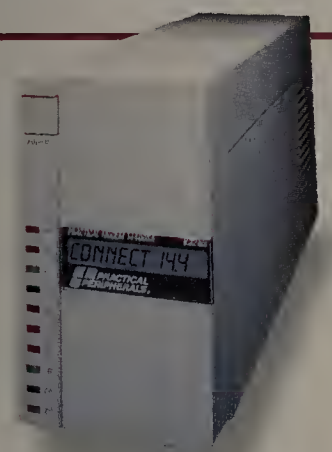

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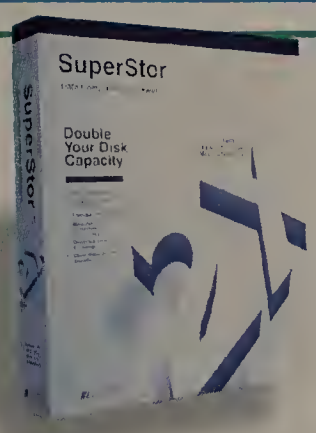

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3297	3½" DS Disks *(10)* ... 9. 6148 *(30)*	25.
3298	3½" HD Disks *(10)* ... 15. 6375 *(30)*	42.
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6715	QD6150 ..... 23. 1602 QD6250	29.

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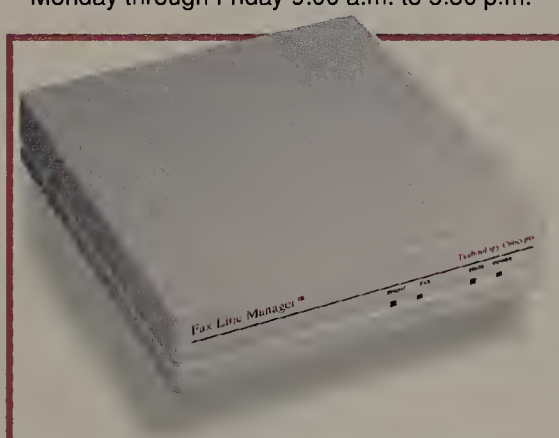

Technology Concepts, Inc. ... 2 years
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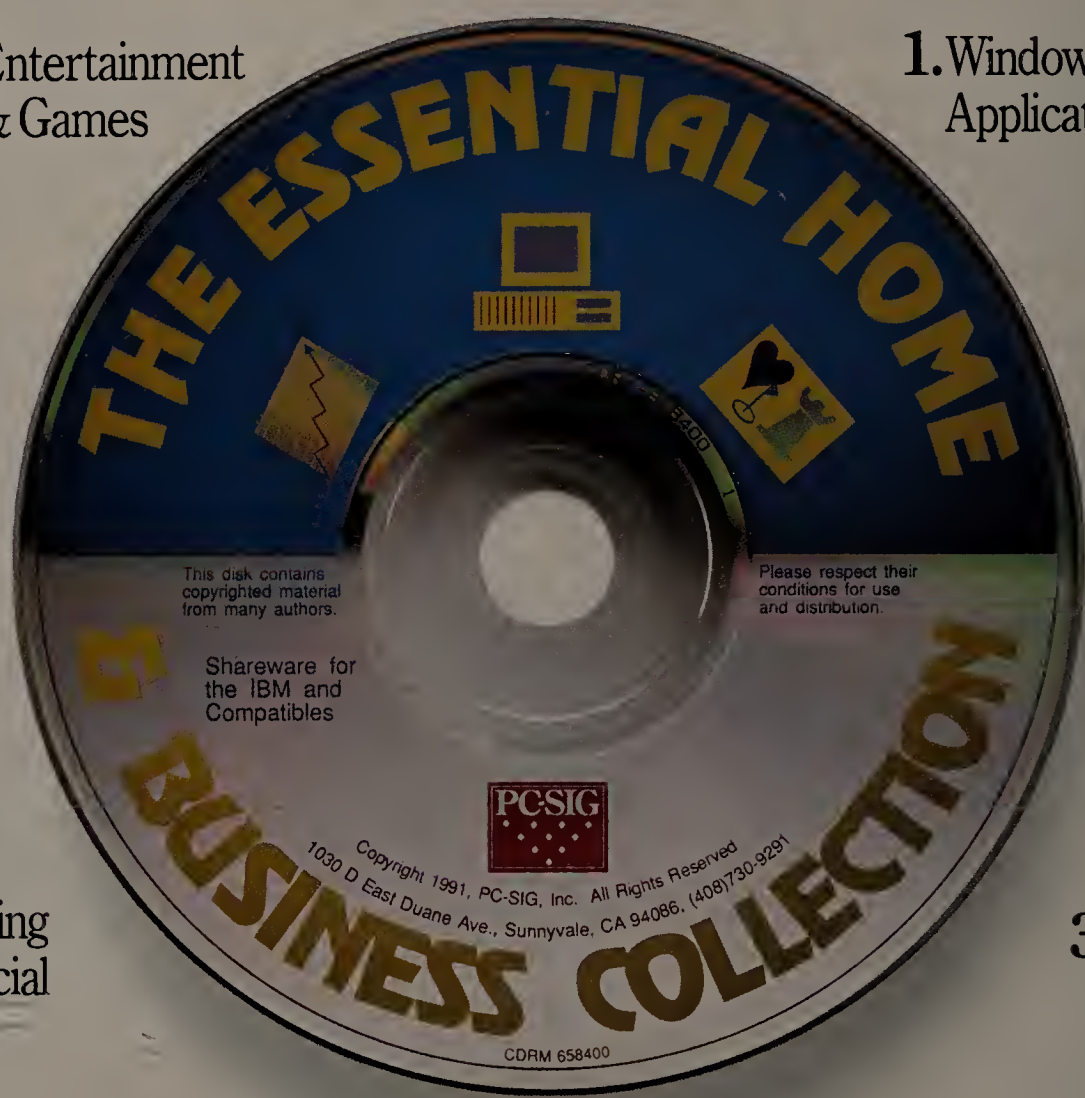

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Circle 230 on reader service card

Memory MANAGERS

Not enough memory for thirsty applications? Here's a look at six packages that take the high road to instant relief.

Are terminate-and-stay-resident (TSR) programs and device drivers hogging your system's memory, leaving little room for applications? Need more memory for that big data base table or spreadsheet? Do your programs complain about insufficient memory when you run them in *Windows'* DOS sessions? If you answered yes to any of these questions, you need a *memory manager,* a software program that squeezes out maximum memory for your applications.

You can add memory to your computer in two ways. If you choose *expanded memory,* most software can use only the memory the CPU "sees" through a narrow window called a page frame, currently 256K with version 4.0 of the expanded memory specification (EMS). If you add *extended memory,* software can access all memory available above 1MB when the processor is switched into a special "protected mode": Programs using the memory above 640K are isolated from one another to prevent conflicts. Microsoft's Extended Memory Specification (XMS) is the de facto memory standard.

To support the full range of available software, your PC should optimize its use of both extended and expanded memory, converting available RAM to either option as needed. What's more, it should provide as much room as possible for memory-hungry DOS applications, many of which bog down or won't run if there's less than 512K of conventional memory available. This means you need a way to load device drivers, TSRs, and DOS itself into other areas of memory above 640K.

The Compleat Memory Manager

All of the extended memory managers (EMMs) reviewed control both extended and expanded memory and can load DOS, drivers, and TSRs above conventional DOS memory. All can give you more than 600K of RAM when you boot up. Although most require at least a 386SX processor to work at all, several will run in a diminished capacity on properly equipped 286

BY BRETT GLASS

or even 8088 systems with EMS 4.0–compliant memory boards. But it's on the 386 and newer processors that these products shine. Thanks to the memory mapping features of the 386 and 486, these programs work memory management magic to overcome the limits of DOS and the PC without additional hardware. Two of these products work their wizardry from different perspectives. *386Max* emphasizes ease of use, compatibility, and the best set of bundled utilities here. *QEMM-386* clearly wins the award for the details of memory handling chores, while sacrificing a small degree of user friendliness and some utilities. Both are superior in their class and are Best Buys.

MS-DOS 5.0 sets the baseline for our comparison of memory management products with its bundled pair of memory managers, HIMEM.SYS and EMM-386.EXE. HIMEM.SYS is a basic extended memory driver for 286, 386, and 486 machines. It manages extended memory and allows you to load DOS into the *high memory area* (HMA), the first 64K of extended memory above the first megabyte of RAM. EMM386.EXE implements EMS 4.0 and allows you to load programs high. HIMEM.SYS and EMM386.EXE are no-frills products. There's no shared memory to shuffle RAM between EMS and XMS (you must state in CONFIG.SYS how much EMS and XMS you want), and you can't optimize the locations of programs that are loaded into high memory. In addition, neither supports systems with more than 16MB of RAM (although new versions that can are shipping with *Windows 3.1*). And if you want to load programs high, there's no automatic installation or configuration to speak of; you need to edit CONFIG.SYS and AUTOEXEC.BAT yourself based on parameters described in the manual.

The two best features of the MS-DOS 5.0 memory managers are their compatibility (they run on nearly every system, thanks to exhaustive testing by Microsoft) and their price (free with every copy of MS-DOS 5.0 or *Windows*). But if you want optimum performance or maximum use of high memory, you'll be better off investing in one of these third-party taskmasters.

Brett Glass is a contributing editor for PC World. *He can be reached on PC World Online (see page 8 for more information).*

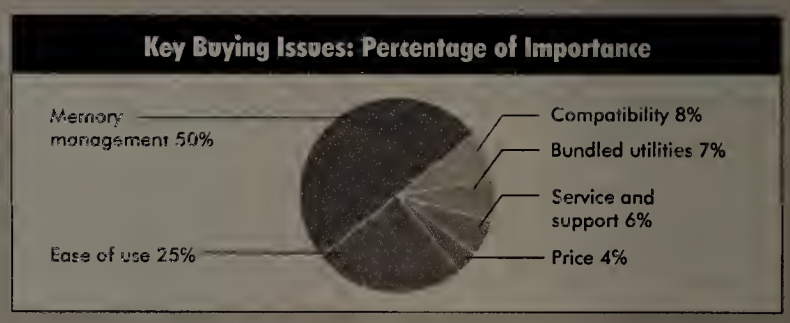
For more information about all products in this article, circle reader service no. 901.

EXECUTIVE SUMMARY

386Max and QEMM-386 Are Tops for High Memory

QEMM-386 shows up strong for memory management, while 386Max takes the prize for user friendliness.

If you're not using a memory manager, you're not getting the most from your system. Both our Best Buys cost just $99.95. Base your choice on your machine's specific memory needs. If you want all the memory management bells and whistles, **QEMM-386** has the most features, followed closely by **NetRoom**, but **386Max** is the winner when it comes to ease of use. Either way, you can't lose with these high-flying packages.

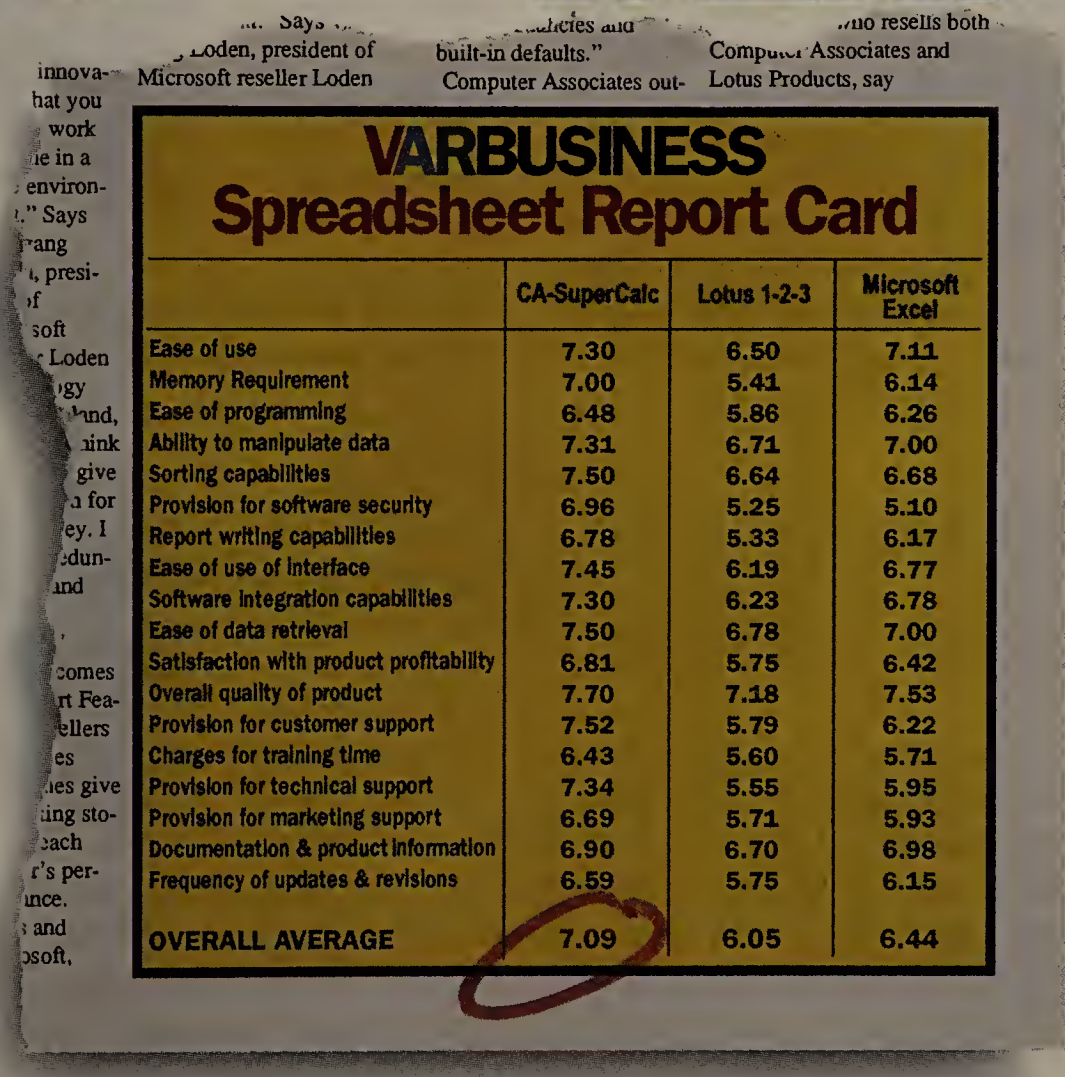


Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Memory management	Ease of use	Compatibility	Bundled utilities	Service and support	Price	Overall value
386Max 6.01	746	★★½	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★
DR DOS 6.0	747	☆	½	☆☆☆½	☆☆	☆☆☆½	☆☆☆☆	★★
Memory Commander 2.19	748	☆½	☆½	☆½	½	☆☆☆☆	☆☆☆☆	★★
NetRoom 2.0	749	☆☆☆½	☆☆☆	☆☆½	☆	☆☆☆½	☆☆☆☆	★★★½
QEMM-386 6.02	750	★★★★	★½	★★★	★★	★★★	★★★★	★★★★
QMAPS 2.1	751	☆☆☆	☆½	½	☆☆½	☆☆☆☆	☆☆☆☆	★★★

Overall value is produced by multiplying each category rating by its weight percentage, summing the results, and grading on a curve to the nearest half number.

The Pros Rate CA-SuperCalc Higher Than Lotus 1-2-3 And Microsoft Excel.



VARBUSINESS
Spreadsheet Report Card

	CA-SuperCalc	Lotus 1-2-3	Microsoft Excel
Ease of use	7.30	6.50	7.11
Memory Requirement	7.00	5.41	6.14
Ease of programming	6.48	5.86	6.26
Ability to manipulate data	7.31	6.71	7.00
Sorting capabilities	7.50	6.64	6.68
Provision for software security	6.96	5.25	5.10
Report writing capabilities	6.78	5.33	6.17
Ease of use of interface	7.45	6.19	6.77
Software integration capabilities	7.30	6.23	6.78
Ease of data retrieval	7.50	6.78	7.00
Satisfaction with product profitability	6.81	5.75	6.42
Overall quality of product	7.70	7.18	7.53
Provision for customer support	7.52	5.79	6.22
Charges for training time	6.43	5.60	5.71
Provision for technical support	7.34	5.55	5.95
Provision for marketing support	6.69	5.71	5.93
Documentation & product information	6.90	6.70	6.98
Frequency of updates & revisions	6.59	5.75	6.15
OVERALL AVERAGE	7.09	6.05	6.44

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In virtually every category from ease-of-use to technical support, CA-SuperCalc was rated higher than Lotus® 1-2-3® and Microsoft® Excel.

We're not surprised. While Lotus and Microsoft have been fussing over their many different spreadsheet versions, we've been stuffing one spreadsheet, CA-SuperCalc, with everything you would ever want. From spreadsheet linking to 3-D graphics and beautiful, presentation-quality output, CA-SuperCalc has it all.

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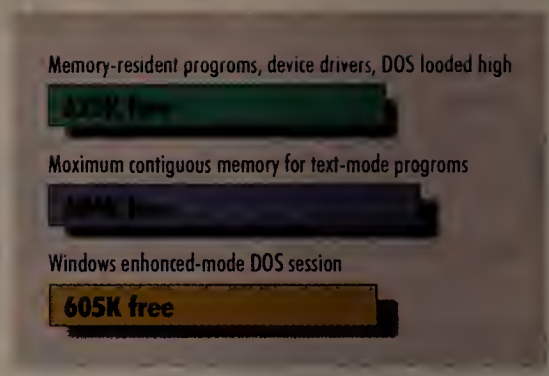
Circle 65 on reader service card

386Max 6.01

★★★★ **PROS:** Easy to use, excellent utilities, supports DPMI
CONS: Doesn't load LASTDRIVE, FCBS high; shortest support hours

386Max is one of the most popular programs in the business. It's one of our favorites, too. It's the only memory manager that supports DPMI, and it rakes in four stars for both ease of use and an excellent utilities bundle including ASQ, a tutorial and system analysis program for tuning your system. The instructional material on memory management is first-rate. *386Max* is a snap to use. If you do get lost, it's the only EMM that has an on-line tutorial. Qualitas also offers fax server support. *386Max* gives you 605K of memory for a DOS application with *Windows* in enhanced mode, a mere 8K less than the leader, and shares our Best Buy.

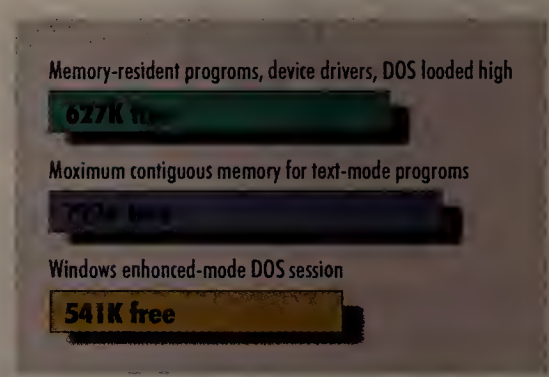


DR DOS 6.0

★★ **PROS:** Maximum conventional memory in some modes
CONS: No full automatic optimization, no systems analysis tool

DR DOS is marketed as an enhanced alternative to MS-DOS, a claim based partly on its improved MemoryMax memory-managing utilities. What DR DOS does, it does very well. It scored best for conventional memory with resident programs, device drivers, and DOS loaded high, and came in a very commendable second behind *Memory Commander* with 723K of memory for text mode programs. It's also one of only two EMMs here compatible with *Windows* in standard mode.

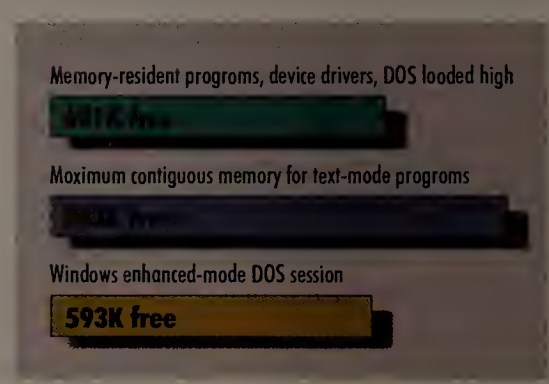
Nonetheless, DR DOS's memory manager falls short of the elite. Among the managers reviewed, it tested lowest for memory available for a *Windows* enhanced mode DOS session—a full 82K less than *QEMM-386*. DR DOS also lacks a full automatic optimization feature and a systems analysis tool.



Memory Commander 2.19

★★ **PROS:** Huge memory in DOS text mode, easy high loading control
CONS: No systems analysis utility or automatic optimization of upper memory usage

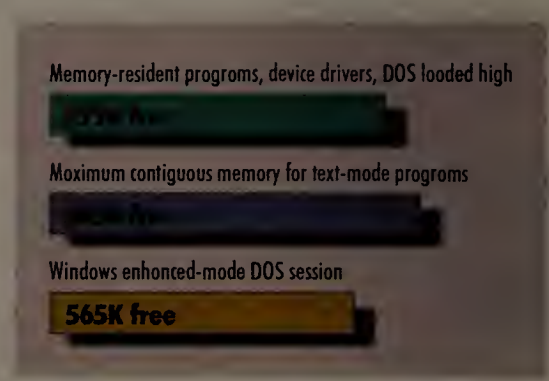
The other EMMs here seek to maximize the space you have to load TSRs outside DOS's conventional memory area, but *Memory Commander* deserves a hand for its unique approach. It reshuffles your ROMs and peripherals to give you more conventional RAM—up to an unbelievable 842K on a VGA system. It's also the only EMM that lets you specify which TSRs and device drivers you want loaded high without making changes to your AUTOEXEC.BAT or CONFIG.SYS file, and the only one reviewed here that provides fast enhanced video BIOS. However, *Memory Commander* doesn't have automatic optimization (promised for a later version) or a systems analysis utility.



NetRoom 2.0

★★½ **PROS:** Exploits virtual machine technology, easy to use
CONS: Stingy utilities bundle

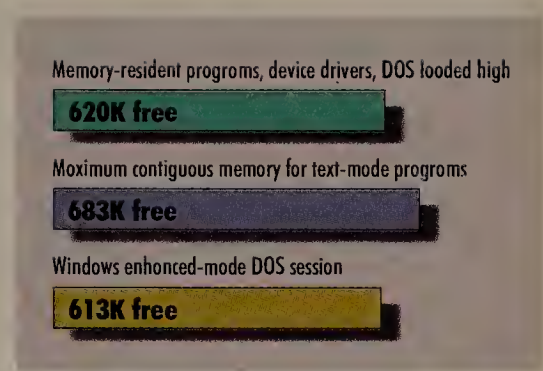
NetRoom's special capabilities were created for network drivers, but the program can handle almost any TSR or driver. It is also the only program reviewed here that makes use of a virtual machine, a major advantage if you want to shift numerous TSRs out of conventional memory. We experienced only a few problems with *NetRoom*. The automatic optimizer quit for lack of memory on one crowded system, and it didn't always fit as many programs into UMBs as those in some of the other packages. But once you get *NetRoom 2.0* working, it will load more TSRs into RAM without using the lower 640K than any of the other memory managers. *NetRoom*'s meager utilities bundle took it out of competition for Best Buy. The system analysis tool is only fair, and there's no RAM disk, ANSI driver, or disk cache.



QEMM-386 6.02

PROS: Most memory management features, reliable optimization
CONS: Small utilities bundle, no DOS command line

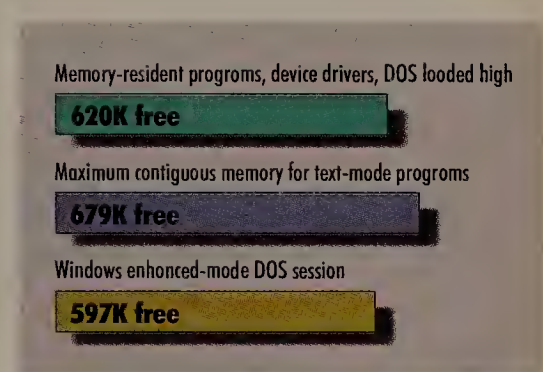
QEMM-386 is among the reigning champs in the world of DOS memory managers, and for good reason: Its memory management and automatic optimization are the best in this review. *QEMM-386 6.02* has most of the features of the other memory managers, and it was the only one tested that could load LASTDRIVE high and swap BIOS ROMs in and out of memory space. With 613K, *QEMM-386* topped our benchmarks for most memory in a *Windows*-enhanced mode DOS session. *QEMM-386 6.02* doesn't come with a RAM disk, ANSI driver, or a disk cache, but it does include *Manifest*, which is by far the best utility available for optimizing your system's use of RAM. *QEMM-386* joins *386Max* as one of the two winners of our Best Buy.



QMAPS 2.1

PROS: Excellent support, good utilities package
CONS: No systems analysis tool, low score for compatibility

Quadtel's *QMAPS 2.1* had trouble sizing some of the programs in our AUTOEXEC.BAT files, particularly the Intel CAS Manager that comes with the SatisFaxtion fax board. *QMAPS* also took the longest of any EMM with automatic UMB optimization to come up with what it believed was an optimal configuration. And although *QMAPS* comes with a RAM disk with a maximum size of 32MB and also has a disk cache, it doesn't provide a system analysis utility. *QMAPS* is packaged with an unlimited network license that averages out to less than $10 per user, and it scores well on memory management itself, but a more user-friendly interface would be a welcome addition.



Buying Smart: Memory Managers

Most extended memory managers offer the same basic features. All these products are compatible with the EMS 4.0 and XMS 2.0 standards and run *Windows 3.0* in 386-enhanced mode. Each has one or two features that set it apart from the pack, but price should not be a consideration: All these packages cost less than $100.

MEMORY MANAGEMENT

Maximizing conventional memory may be important to you if you're running memory-hungry programs that can't take advantage of extended or expanded memory. All the memory managers here give you more than 600K of conventional memory. Some, like *QEMM-386* and *NetRoom*, also include utilities such as VIDRAM, which frees up space normally claimed by your video adapter. The amount of RAM you'll get is typically 96K with EGA or VGA and 64K with mono—but you'll have to give up the RAM again if you want to use graphics. If you're looking for the absolute largest amount of conventional RAM possible, *Memory Commander* is the only product that provides up to a whopping 842K.

If you have lots of TSRs and drivers to load, you can sometimes maximize the number you pack into high memory if a program has a user-controlled placement option. Likewise, a memory manager that uses page frames sometimes has the advantage when it comes to squeezing large programs into crowded high memory. Also investigate how much code each memory manager can place outside the lower 640K of RAM. *NetRoom* uses 386 "virtual machine" technology to win the prize in this category—it creates what amounts to a second PC within your PC into which you can then load more than 500K of TSRs outside conventional memory. However, this technique works best with network drivers and TSRs that don't require direct interaction. It isn't good for TSRs that "pop up," because *NetRoom* has to play special tricks (which don't always work) to redirect hot keys to programs in virtual machines.

(continues)

FEATURES EVALUATION

EMMs You Can't Forget

Most of these extended memory managers offer the same fundamental features, but 386Max and QEMM-386 go beyond the basics to make themselves truly memorable.

● Yes
○ No

	MS-DOS 5.0[1]	386Max 6.01	DR DOS 6.0	Memory Commander 2.19	NetRoom 2.0	QEMM-386 6.02	QMAPS 2.1
Standard features							
List price	$99.95	$99.95	$99	$99.95	$99	$99.95	$99.95
Conventional memory used by manager (K)	9.3[2]	1	1.6	2.3	5	3	3.3
Memory management							
Conventional memory free[3]							
Memory-resident programs, device drivers, DOS loaded high (K)	613	622	627	621	622	620	620
Maximum contiguous memory for text-mode programs (K)	613	684	723	842[4]	685	683	679
Windows enhanced-mode DOS session[5] (K)	601	605	541	593	565	613	597
User-controlled placement of objects loaded high	○	●	●	●	●	●	●
Uses page frames for programs loaded high	○	●	●	○	●	●	●
Runs drivers/TSRs in separate virtual machines	○	○	●	○	●	●	○
Loads FCBS high	○	○	●	○	●	●	○
Loads LASTDRIVE high	○	○	●	○	○	●	○
Maps BIOS ROMs into RAM	○	●	●	●	●	●	●
Swaps BIOS ROMs in and out of memory space	○	○	●	○	○	●	○
Compresses or eliminates unneeded ROMs	○	●	●	○	●	●	○
Maps peripheral ROMs into RAM	○	●	●	●	●	●	●
Provides enhanced video BIOS	○	○	●	●	○	●	○
Automatic optimization of UMB usage	○	●	●	○	●	●	●
Allocates EMS and XMS from common pool	○	●	●	○	●	●	●
Loads programs high with no changes to AUTOEXEC.BAT or CONFIG.SYS	○	○	●	●	○	●	○
Compatibility							
With Windows 3.0 in standard mode	○	○	●	○	○	●	○
With TSR instancing in 386 mode	○	●	●	●	●	●	○
With DPMI DOS extender	○	●	●	○	○	●	○
With 286 CPU	○	●	●	○	●	●	○
Bundled utilities							
RAM disk	●	●	●	●	○	●	●
ANSI driver	●	○	●	●	○	●	○
Comprehensive system analysis utility	○	●	●	○	●	●	○
Disk cache	●	●	●	○	○	●	●
Service and support							
Daily support hours	9	7	8	8	7.5	9	9.5
Fax server support	●	●	●	○	○	●	○
Money-back guarantee	○	●	●	●	●	●	●
			BEST BUY			BEST BUY	

[1] Not reviewed; shown for comparison purposes only.
[2] Includes HIMEM.SYS version 2.77and EMM386.EXE version 4.33.06X.
[3] Boot files' contents before installing memory manager:

CONFIG.SYS
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
FILES=30
BUFFERS=30
DEVICE=C:\DOS\SETVER.EXE

AUTOEXEC.BAT
PROMPT PG
PATH=C:\DOS
SET TEMP=C:\DOS

[4] Memory Commander has increased memory in this mode if monochrome adapter is used.
[5] MOUSE.COM and SMARTDRV.SYS added to boot file.

Buying Smart: Memory Managers *(continued)*

Managers that load FILES, FCBS, and LASTDRIVE into high memory free more conventional memory, and your system will run faster if the manager also maps BIOS ROMS—software instructions that operate your computer and its peripherals—into RAM. *QEMM-386*'s Stealth feature swaps your BIOS ROMs in and out of memory to make room for TSRs. Stealth plays tricks that crash some systems, and it doesn't work with all TSRs, but when it does work it gives you lots of upper memory space. Several of the other programs in this group reclaim the space consumed by unused ROMs to let you load more TSRs and drivers high. *386MAX* is especially good at this. Several products free up conventional memory by mapping ROMs from peripherals like printers and scanners into RAM, but only *Memory Commander* provides faster video BIOS that also runs from extended memory.

EASE OF USE

Upper memory blocks (UMBs)—memory from 640K to 1MB—hold most of your TSRs and device drivers. Automatic UMB optimization is a vital feature to look for in an EMM unless you relish tinkering with your system and rebooting it for hours on end. We found *QEMM-386* and *386MAX* to have the best and most foolproof optimization. *NetRoom*'s optimizer worked well much of the time but failed on one system that was stuffed with TSRs. *Memory Commander* didn't include an optimizer, but the company claims that a new version with optimizer will be out by the time you read this.

COMPATIBILITY

Only DR DOS 6.0 and *QEMM-386 6.0* let you run *Windows 3.0* in standard mode, which is not capable of some functions such as multitasking but is faster than the 386-enhanced mode.

TSR instancing allows you to load a TSR once and pop it up in multiple *Windows* DOS sessions. If you're using *Windows* primarily as a DOS multitasker, and you run TSRs, this could be a vital feature for you.

Some programs, such as Microsoft's *C/C++ 7.0* compiler, use the DOS Protected Mode Interface (DPMI) standard to access extended memory. If you want to use a memory manager with these programs, *386Max* is your only choice, unless you plan to run the programs within *Windows*, which provides DPMI services.

BUNDLED UTILITIES

A system analysis utility may help you fine-tune your system to get even more use from available memory. We liked *QEMM-386*'s utility, which offers tips on optimizing your PC's configuration and tells you the advantages and drawbacks of each. *386Max*'s utility comes with an excellent tutorial on memory management, as well as system analysis tools.

SERVICE AND SUPPORT

If your memory manager installs without a hitch, you may not need special help. But if something goes wrong, as it did several times during our testing, customer service and support are vital. Since none of these companies offers toll-free technical help or weekend support, it's doubly important to look for a vendor with longer support hours and a fax server that can send you standardized instructions to help cope with common problems on weekends.

Finally, a money-back guarantee is your insurance against getting stuck with a product that's not compatible with your system. Regardless of what other features you look for, make sure that you can return the product if it doesn't work on your machine.

WHERE TO BUY

386Max 6.01
Qualitas, Inc.
7101 Wisconsin Ave.
#1386
Bethesda, MD 20814
800/733-1377,
301/907-6700
List price: $99.95
Reader service no. 746

DR DOS 6.0
Novell Inc.
70 Garden Ct.
Monterey, CA 93940
800/274-4374,
List price: $99
Reader service no. 747

Memory Commander 2.19
V Communications, Inc.
4320 Stevens Creek Blvd.
#275
San Jose, CA 95129
800/648-8266,
408/296-4224
List price: $99.95
Reader service no. 748

NetRoom 2.0
Helix Software Co., Inc.
47-09 30th St.
Long Island City, NY
11101
800/451-0551,
718/392-3100
List price: $99
Reader service no. 749

QEMM-386 6.02
Quarterdeck Office Systems Inc.
150 Pico Blvd.
Santa Monica, CA 90405
310/392-9851
List price: $99.95
Reader service no. 750

QMAPS 2.1
Quadtel Corp.
3190-J Airport Loop Dr.
Costa Mesa, CA 92626
800/748-5718,
714/754-4422
List price: $99.95
Reader service no. 751

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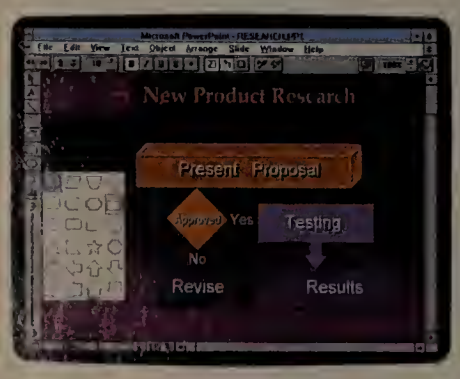

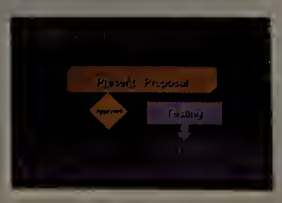

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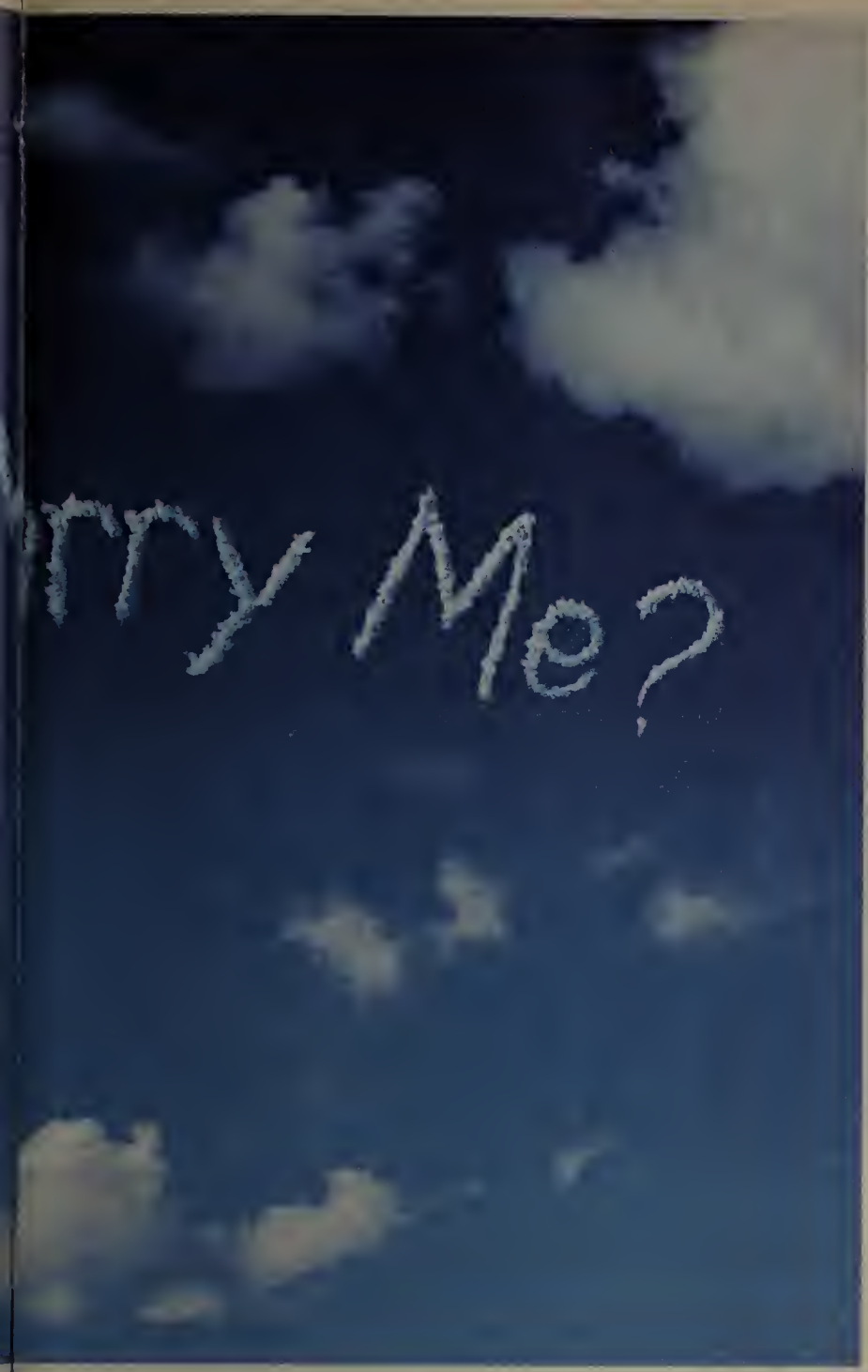

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Antivirus SOFTWARE

You escaped Michelangelo, but you may not be so lucky next time. Here are 24 antivirus programs that will let you breathe a little easier.

Okay, so the Michelangelo virus didn't turn out to be such a disaster. But like a motorist who drives by a gruesome accident, you probably asked yourself, "What if . . . ?"

That's why the overblown Michelangelo scare resulted in booming sales of antivirus programs. And it's also why more users are promising themselves to perform virus checks and to back up their data regularly. Those who actually did get infected by Michelangelo are likely to be even more diligent in checking for the little nasties.

They're Here to Stay

The term *computer virus* is an apt one. Computer viruses, like biological viruses, are spread by contact. Your computer gets "sick" when it picks up a virus that's hitchhiking on foreign floppy disks or program files downloaded from bulletin boards. Computer viruses can attack any executable computer file, overlay file, file allocation table (FAT), partition table, or boot sector.

Unfortunately, new varieties of computer viruses appear constantly. As soon as one virus is contained by antivirus software, another one that isn't covered by your antivirus program crops up. Michelangelo, for example, managed to escape most antivirus programs released before January 1992, when word of the contamination first spread.

A Viral Bestiary

But Michelangelo represents only one type of virus—a boot-sector virus. These viruses reside in a disk's boot sector (the first sector of the disk, which contains information telling the computer where to find DOS). If you boot your system with an infected floppy, the virus inserts itself into your hard disk. In the case of Michelangelo, it lies dormant until March 6 (the artist's birthday), when it starts overwriting the FAT and the partition table, quickly cor-

BY PATRICK MARSHALL

rupting all data on the drive.

In addition to boot-sector viruses, there are program-infecting viruses. Once they're inserted into the program code, these viruses move into the computer's memory whenever you launch the tainted program and then infect other files, destroying program files and flashing strange messages.

You can often eliminate a program-infecting virus by deleting the file that carries it—assuming you know the virus is there. If it's a so-called stealth virus, you probably won't know its location, since it evades discovery by making a clean copy of a file and then directing the virus checker to that copy, leaving the virus undetected. Taking another tack, a "worm" duplicates itself, either on a disk or in memory, until it fills your disk completely. In some cases, a worm can hide inside files, making removal particularly tricky.

Eradication Strategies

To counterattack, antivirus programs employ several defensive strategies. Most programs scan files, boot sectors, and other sections of the disk for virus "signatures," or code strings. If the antivirus program finds a match, it notifies the user and removes the virus. But this method depends on the program recognizing each virus's signature. Since new viruses crop up all the time, that tactic can't ensure protection.

Other antivirus programs will monitor your computer's memory for telltale signs of infection, such as unexpected

ANTIVIRUS SOFTWARE

			SCANS FOR VIRAL SIGNATURES				MONITORS			
Manufacturer	Product	Price	Executable files	Data files	Conventional/ extended memory	Disk sector/ boot partition table	RAM required for memory-resident mode (full/minimum protection)	Blocks virus from becoming memory resident	Scans from floppy drive	Checks for unknown virus
ABACUS	Virus Secure for Windows 3.0	$95	Y	Y	Y/Y	Y	n/a [2]	n/a [2]	Y	Y
CENTRAL POINT SOFTWARE	Central Point Anti-Virus 1.2	$129	Y	Y	Y/N	Y	6K/1K	Y	Y	Y
CERTUS INT'L	NOVI 1.01	$129	Y	N	Y/Y	Y	20K/1.6K	Y	Y	Y
COMMCRYPT	Detect Plus	$149.95	Y	Y	Y/Y	Y	27K/24K	Y	Y	Y
THE DAVIDSOHN GROUP	Vaccine 4.33	$99.95	Y	Y	Y/Y	Y	4K/13K	Y	Y	Y
DIVERSIFIED COMPUTER PRODUCTS	PC Doctor	$99.95	Y	Y	Y/Y	Y	18K [4]	Y	Y	Y
ENIGMA LOGIC	SafeWord Virus-Safe	$62	N	N	N/N	N	20K [4]	N	Y	Y
FIFTH GENERATION SYSTEMS	Untouchable 1.0	$165	Y	Y	Y/N	Y	4K [4]	Y	Y	Y
G4 SOFTWARE	Virotect Professional	$95	Y	Y	Y/Y	Y	15K/0.6K	Y	Y	Y
IMSI	VirusCure Plus	$99	Y	N	Y/Y	Y	22K/6K	Y	Y	Y
INT'L SECURITY TECHNOLOGY	Virus-Pro	$99.50	N	N	N/N	N	n/a [2]	n/a [2]	Y	Y
IP TECHNOLOGIES	Virus Guard	$24.95	N	N	N/N	N	n/a [2]	n/a [2]	Y	Y
MCAFEE ASSOCIATES	Viruscan	$15–$35 [7]	Y	[8]	Y/Y	Y	33K/4K [9]	Y	Y [10]	Y
MICROCOM	Virex for the PC 2.2	$99	Y	Y	Y/Y	Y	40K/1K	Y	Y	Y
ONTRACK COMPUTER	Dr. Solomon's Anti-Virus Toolkit 5.55	$149.95	Y	Y	Y/Y	Y	5K [4]	Y	Y	Y
PARSONS TECHNOLOGY	ViruCide Plus	$69	Y	Y	Y/Y	Y	10K [4]	Y	Y	Y
PC GUARDIAN	Virus Prevention Plus 5.10	$124.95	Y	Y	Y/N	Y	24K [4]	Y	Y	Y
RG SOFTWARE SYSTEMS	Vi-Spy 9.0 Professional Edition	$149.95	Y	Y	Y/Y	Y	10K [4]	Y	Y	Y
SOFTWARE CONCEPTS DESIGN	Flu-Shot+ 1.84	$19	Y	Y	Y/Y	Y	16K [4]	Y	Y	Y
SYMANTEC	Norton AntiVirus 2.0	$129	Y	Y	Y/Y	Y	39K/1.5K	Y	Y	Y
SYSTEMS PERIPHERALS	ThunderByte 2.2	$230	Y	Y	Y/Y	Y	1K [4]	Y	Y	Y
T.C.P. TECHMAR COMPUTER PRODUCTS	AntiVirusPlus	$99.95	Y	Y	Y/Y	Y	25K/8K	Y	Y	Y
TREND MICRO DEVICES	PCRx 2.0	$69	Y	Y	Y/Y	Y	9.6K [4]	Y	Y	Y
XTREE	ViruSafe 4.5	$99	Y	Y	Y/N	Y	12K/9K	Y	Y	Y

[1] In response to new viruses.
[2] No memory-resident mode.
[3] Separate version available.
[4] Protection mode not user definable.
[5] Windows compatible.
[6] Makes copy.
[7] Prices may vary per program.
[8] Extra-cost option.

BIOS calls or attempts to write directly to the drive. Some virus checkers "immunize" your system by running a *checksum* (a numeric code reflecting a file's integrity) on each executable file. If, on a subsequent pass, the *checksum* has changed, the program alerts you to the potential presence of a virus. This method, too, has its weaknesses, since it assumes programs are clean on the first pass. With this approach, the software won't detect a virus until *after* your system has been infected.

Pick Your Poison

So how do you decide which antivirus program is best for you? Go for a program that's thorough. Some of the programs that monitor memory, for example, will examine conventional memory only—the first 640K of RAM. That's generally where viruses hide out. But some may lurk in high memory, so look for a program that checks that as well.

For ultimate protection, consider buying two programs: one that focuses on scanning for virus signatures and provides a RAM-resident monitor and another that focuses on differential detection—especially one that uses a variety of methods to detect file changes.

Buying two virus checkers may also help protect you from false alarms. This can occur if a portion of a program's executable code looks like a virus signature, or if the checksum notices a change in file size. If a virus checker tells you a virus exists on only a single file, names a virus you suspect is extinct, or tells you

Protects boot sector, partition table	Protects FAT	Protects COMMAND .COM	Protects hidden system files	Logs suspect activity	Removes virus	Double-checks for false alarm	Network support	Frequency/price of update [1]	Method of update	Versions available	Reader service number
N	N	N	N	Y	N	N	N	as necessary/free	BBS, disks	Windows	645
Y	Y	Y	Y	N	Y	N	Y	monthly/free	CompuServe, BBS, fax	DOS, Windows	646
Y	N	Y	Y	Y	Y	N	Y	not required	n/a	DOS, Windows	647
Y	N	Y	Y	Y	Y	Y	Y	quarterly by mail, as needed by BBS/free	BBS, disks	DOS, Windows	648
Y	Y	Y	Y	Y	Y	Y	Y [3]	as needed/free	BBS, disks	DOS, Windows	649
Y	Y	Y	Y	Y	Y	Y	Y	infrequent	mail	Windows	650
N	N	N	N	N	N	N	Y	not required	n/a	DOS	651
Y	N	Y	Y	Y	Y	Y	Y	quarterly/free on BBS, $15 per disk	BBS, disks	DOS	652
Y	Y	Y	Y	Y	Y	Y	Y	as needed/free	BBS, disks	DOS [5]	653
Y	Y	Y	Y	N	Y	Y	Y	6–8 weeks/free on BBS, $30 per disk	BBS, disks	DOS [5]	654
Y [6]	N	Y	Y	Y	N	N	Y	not required	n/a	DOS	655
N	N	N	N	N	N	N	N	not required	n/a	DOS	656
Y	Y	Y	Y	Y	Y	Y	Y	4–5 weeks or as needed/free	BBS	DOS, Windows	657
Y	Y	Y	Y	Y	Y	Y	Y	quarterly/$25 per year	disks	DOS [5]	658
Y	Y	Y	Y	Y	Y	Y	Y	quarterly/$130 for first year, $80 per year thereafter	disks	DOS, Windows [11]	659
Y	Y	Y	Y	N [12]	Y	Y	Y	quarterly/$19	disks	DOS	660
Y	N	Y	Y	Y	Y	Y	Y	quarterly or as needed/$15 per year	BBS, disks	DOS	661
Y	Y	Y	Y	Y	Y	Y	Y	quarterly or as needed/ free for first year	BBS, disks	DOS, Windows	662
Y	Y	Y	Y	N	N	Y	Y	as needed/$10	BBS, disks	DOS	663
Y	Y	Y	Y	Y	Y	Y	Y	as needed by BBS, quarterly by mail/ free on BBS, $12 by mail	BBS, CompuServe, disks	DOS, Windows	664
Y	Y	Y	Y	Y	N	Y	Y	as needed/free	BBS, disks	DOS, Windows	665
Y	Y	Y	Y	Y	Y	Y	Y	2–3 months or as needed/$29	disks	DOS, Windows	666
Y	Y	Y	Y	Y	Y	Y	Y	twice a year/free for first year	BBS, disks	DOS, Windows	667
Y	Y	Y	Y	Y	Y	N	Y	quarterly or as needed/one free, after that $19.95	disks, CompuServe, BBS	DOS	668

[9] Depending upon how well optimized for maximum performance.
[10] DOS version only.
[11] OS/2 version also available.
[12] Creates a log of discovered viruses, not activity.

For more information about all products in this table, circle reader service no. 902.

The 10
MOST WANTED VIRUSES*

MICHELANGELO overwrites the first 9MB of an infected hard disk on Michelangelo's birthday, March 6. The lost data is not recoverable. You catch it by booting from an infected floppy.

STONED displays the message 'Your PC Is Now Stoned!' on every eighth system boot. The virus may overwrite your hard disk FAT and make it difficult to retrieve files from infected floppies. You catch it by booting from an infected floppy.

NO-INT(STONED 3) is a variant of Stoned that's undetectable while the virus is resident in memory. It may conflict with disk utility programs and destroy the boot sector or the partition table.

JERUSALEM, which has many strains, reduces free memory and may play "Frère Jacques" at 5-minute intervals on Fridays, slow the system, display a black box half an hour after a file is infected, and reattach itself to EXE files until they're too big to fit in memory. It attaches to COM, EXE, and overlay files and transmits via floppies, networked drives, and serial links.

AZUSA installs itself as a TSR and infects floppies. Once it has infected 32 disks, it scrambles the serial and parallel ports on the host system so that peripherals no longer work. Azusa

may also render floppies unusable and overwrite files on high density disks. You catch it by booting from an infected floppy.

JOSHI locks up infected systems on January 5 and displays the message 'Type Happy Birthday Joshi!' until you obey. It causes the system to write to and format 5¼-inch 1.2MB disks as 360K formatted disks, rendering them unreadable until reformatted. You catch Joshi by booting from an infected floppy.

FORM plays simulated key clicks when you use the keyboard on the 18th or 24th day of the month. It may also corrupt or damage files on the disk. You catch it when you boot from an infected floppy.

DARK AVENGER installs itself in memory and infects COM, EXE, and overlay files. On every 16th infection, it overwrites a random disk sector. It also cross-links files, damages the FAT, and degrades network performance. It infects floppies, hard disks, and networked drives.

1575 displays a caterpillar that eats characters. It attaches itself to COM and EXE files when you perform DOS operations but doesn't damage them.

CASCADE 170X attaches to COM files and, when an infected file is executed, installs itself as a TSR. It may lock up or reboot the system. One variant formats the hard disk at a random time after the virus is activated. It can spread to floppies, hard drives, and networks.

**Based on occurrences of viruses reported to McAfee Associates in the first quarter of 1992.*

it's found a virus when you've installed a new version of software over an old one, it's possible that the checker could be mistaken. If you suspect a false alarm, call the vendor of your antiviral package.

Second, look closely at upgrade policies, particularly for the program you're using to check for virus signatures. If upgrades are available from a bulletin board, you can download protection as soon as you hear of a new virus.

Some users will have special considerations, such as RAM consumption, though most of these programs can run in high memory, leaving only a small kernel behind in conventional memory. Network administrators will want LAN support and security features, such as the ability to prevent users from running program files on network machines without administrator approval.

An Ounce of Prevention

Ultimately, the best defense against computer viruses is prevention. In addition to regular scanning, it's wise to make regular backups, especially if you

use downloaded program files or floppy disks. Since viruses in a backed-up program are dormant, regular backups mean you'll be able to recover from a virus-induced crash by restoring files once you've zapped the bug. Just don't forget to check your restored backups; they may be infected as well.

One issue that should not be of much concern is price. Each program listed here is less than $250. As insurance rates go, that's not much to pay.

Patrick Marshall is a freelance writer in Silver Spring, Maryland.

WHERE TO BUY

Abacus
800/451-4319,
616/698-0330

Central Point Software
800/445-4208,
503/690-8088

Certus Int'l
216/546-1500,
216/546-1450 (fax)

Commcrypt
800/334-8338,
301/470-2507 (fax)

The Davidsohn Group
212/422-4100,
212/422-1953 (fax)

Diversified Computer Products and Services
617/592-9001,
617/776-1515 (fax)

Enigma Logic
510/827-5707,
510/827-2593 (fax)

Fifth Generation Systems
504/291-7221,
504/291-5453 (fax)

g4 Software
800/486-9552,
310/536-9796 (fax)

IMSI
800/833-4674,
415/454-8901 (fax)

International Security Technology
212/288-3101,
212/644-6828 (fax)

IP Technologies
714/545-9001,
714/549-5075 (fax)

McAfee Associates Ltd.
408/988-3832,
408/970-9727 (fax)

Microcom
919/490-1277,
919/490-6672 (fax)

Ontrack Computer Systems
800/752-1333,
612/937-1107

Parsons Technology
800/223-6925,
319/395-9626

PC Guardian
800/288-8126,
415/459-1162 (fax)

RG Software Systems
602/423-8000,
602/423-8389 (fax)

Software Concepts Design
607/326-4422,
607/326-4424 (fax)

Symantec Corp.
800/441-7234,
408/252-3570

Systems Peripherals
508/535-6196,
508/535-6191 (fax)

T.C.P. Techmar Computer Products
800/922-0015,
718/997-6666

Trend Micro Devices
800/228-5651,
310/328-5892 (fax)

XTree Co.
805/541-0604,
805/541-8053 (fax)

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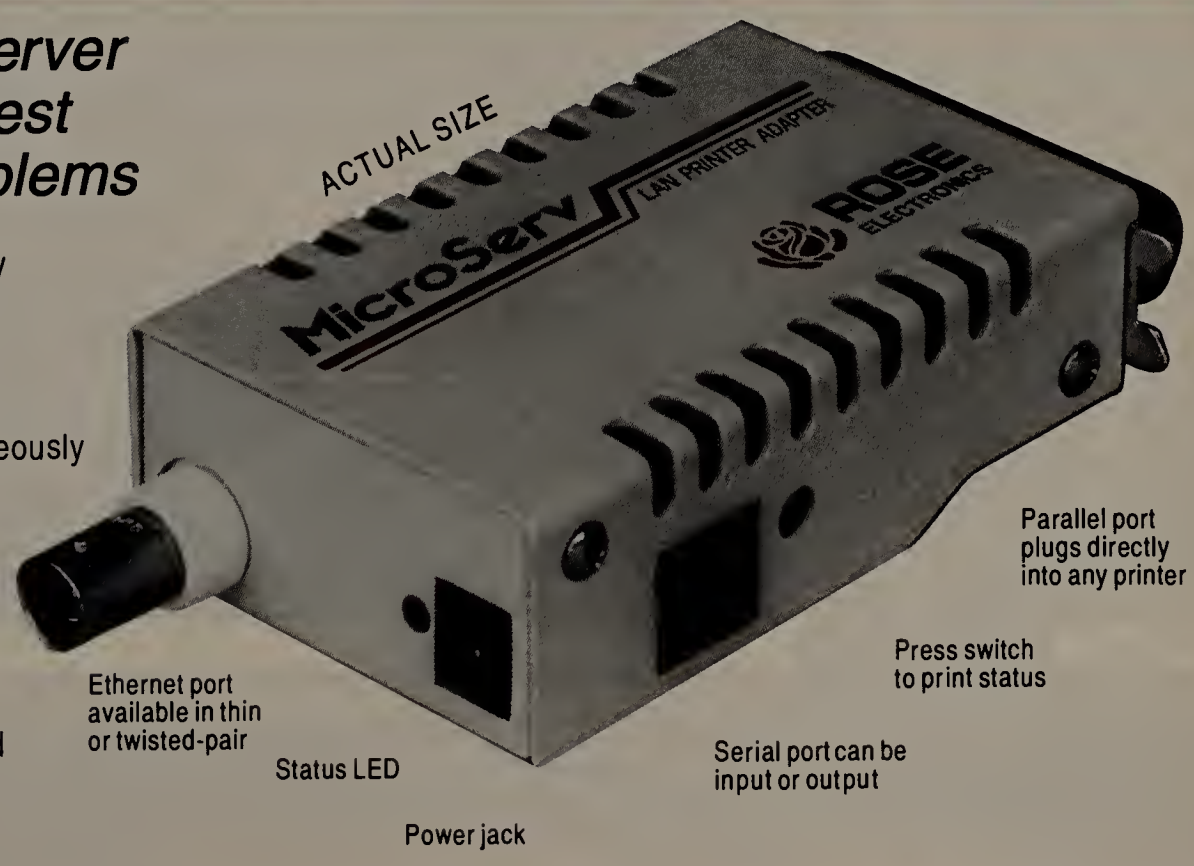

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Circle 239 on reader service card

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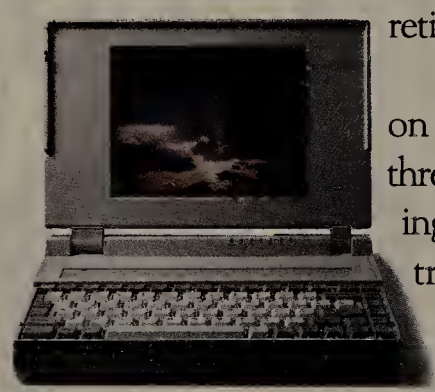
Consider that with its active matrix Super VGA color screen, the T4400SXC can actually display a kaleidoscope of 256 simultaneous colors at a 640 x 480 pixel resolution.

Remarkably, these 256 colors can be drawn from a palette of 185,000 colors to give life to photographic images and color intensive presentations. It's enough to make your retina want to take a vacation.



Not to mention that each pixel on the screen is controlled by three individual transistors, ensuring perfect focus and color registration. The result is amazing clarity far superior to desktop monitors and a brighter, faster screen that far exceeds passive matrix LCD color screens.

Combined with a blazing 25MHz, 486SX microprocessor and 8K internal cache, it's powerful enough to handle your wildest visions.

Of course, you shouldn't be limited by the number of ideas you have either. Which is why the T4400SXC is equipped with a 120MB hard drive for plenty of storage. And 4MB of RAM expandable to 20MB.

And since ideas happen anywhere, any time, we've designed it to fit in half of a briefcase and given it a Nickel Cadmium battery that lasts 3 hours per charge.

Of course, there are times like payday when it is necessary for you to be in the office. Which is why we made our new notebook to be expandable with our Deskstation IV, giving you two expansion slots, and ports for external monitor and external keyboard.

intel inside

Naturally, this is all just the tip of the iceberg, so call us at 1-800-457-7777 for more information.

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Circle 285 on reader service card

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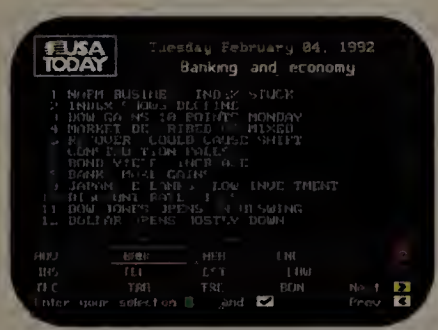

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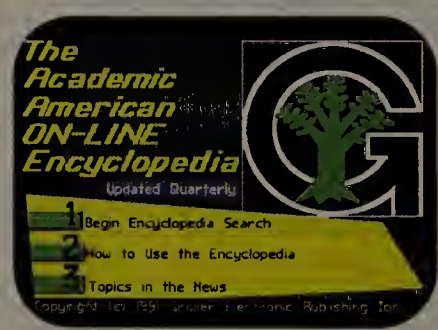

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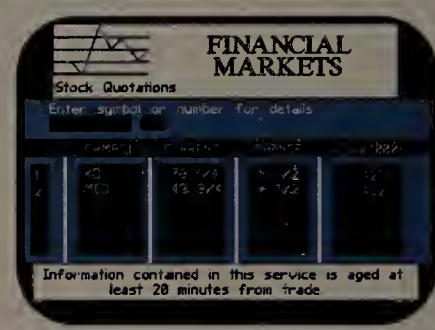

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NATIONAL VIDEOTEX

Circle 178 on reader service card

The Experts' FAVORITES

You want advice, and our own PC World columnists have plenty to spare. Read on for their surprising answers to the question: "What little programs can you not live without?"

There are times when a computer magazine should be scientific and dispassionate, selecting and rating software by fair and unprejudiced criteria. This isn't one of them. Instead, we asked our nine regular columnists for some very personal opinions. We wanted to know what small, low-cost utilities they've found useful or fun, and why.

First, *The Help Screen*'s Robert Lauriston and *The Home Office*'s Steve Bass discuss the programs they use to make DOS more pleasant and productive. And since *Windows* can stand a little improvement as well, we queried Scott Dunn of *Windows Workshop* about his favorite enhancements.

Most spreadsheets, word processors, and other applications also come with gaps. *Spreadsheets (A..Z)* columnist Richard Scoville suggests some *1-2-3* and *Excel* add-ins that make number crunching easier, and George Campbell of *Word Processing Clinic* tells you where to find font managers, writers' tools, and *Word for Windows* macros. *Data Basics*' Celeste Robinson discusses some tools for making data managers more manageable, and *Publishing and Presentations*' Richard Jantz describes publishing utilities you may want on your desktop. Next, Judy Heim of *Communications Q&A* fills us in on helpful dialers, downloaders, and decompressors. Finally, for those who write software as well as use it, *Star-Dot-Star*'s Brett Glass reveals the best utilities for programmers.

So read on for some free advice. And the programs you'll discover won't cost much, either.

EDITED BY
LINCOLN SPECTOR

ROBERT LAURISTON'S *Favorite DOS Utilities*

LapLink Pro 4.0a

LapLink's the easiest, fastest way I've found to transfer files between my 386 clone and my TI2000 laptop. The latest version's new batch language makes getting ready for a business trip even easier. I set up one batch command to copy all my current address book, appointment calendar, E-mail, telecom, and expense tracking files to the laptop. When I return from the road, a second batch operation reverses the process, then copies any data files I created on the trip to matching directories on my base system's hard disk. If I find that I've left important files behind, I can even use *LapLink*'s modem connection to download them from the office. Traveling Software, Inc., 18702 N. Creek Pkwy., Bothell, WA 98011; 800/343-8080, 206/483-8088, 206/487-1284 (fax). List price: $170.

Reader service no. 605

Mac-In-DOS 1.1

Macintoshes have had the software to read DOS disks for years, but when you first put a DOS floppy into a Mac, the operating system asks if you want to format it—many users mistakenly go ahead and erase the information. If you need to exchange files with Mac users, *Mac-In-DOS* skirts the problem by letting you copy files to and from a Mac 1.44MB floppy on your PC's 3½-inch floppy drive. It even formats Mac floppies. Mac users can send you their regular disks, and you can send them disks that won't drive them crazy. One warning: A *Windows* version may be out by the time you read this. Pacific Microelectronics, 201 San Antonio Cir, Ste. C250, Mountain View, CA 94040; 800/628-3475, 415/948-6200, 415/948-6296 (fax). List price: $199.

Reader service no. 606

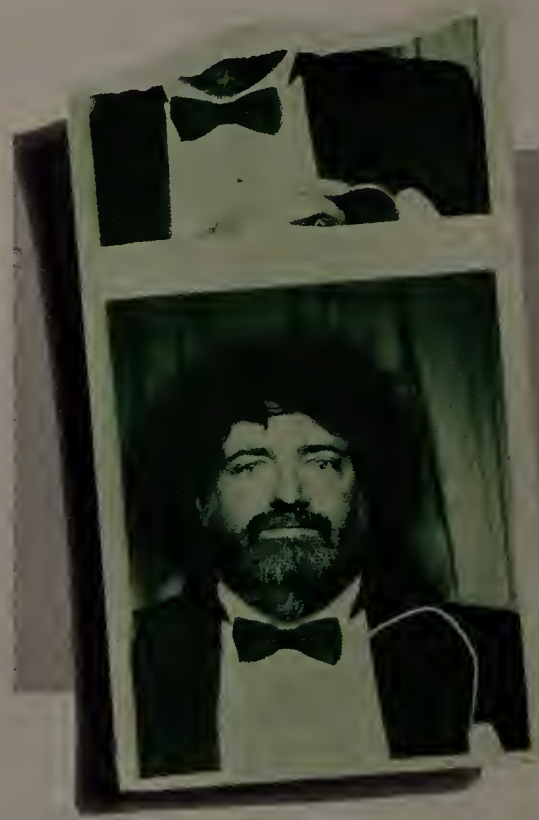
Test Drive 3.1

Floppy disk errors are usually caused by bad disks or dirt, but they can also stem from a badly aligned or damaged drive. How can you tell? *Test Drive* runs ten tests to provide a definitive diagnosis of your floppy disk ills. MicroSystems Development, 4100 Moorpark Ave. #104, San Jose, CA 95117; 408/296-4000, 408/296-5877 (fax). List price: $115 with one diagnostic disk, $215 with all three (360K, 1.2MB, 720K/1.44MB).

Reader service no. 608

Viruscan 86B

✔SHAREWARE Until my test network got hit by Michelangelo, I used *Viruscan* only to screen software for a BBS. Now I scan every floppy that comes my way. This bargain-priced utility is constantly updated for finding newly discovered viruses, and the company's phone support is great. It's available as SCAN86B.ZIP on PC World Online and other on-line services. McAfee Associates, 3350 Scott Blvd., Bldg. 14, Santa Clara, CA 95054; 408/988-3832, 408/988-4004 (BBS), 408/970-9727 (fax). Registration fee: $25.



VPIC 4.6

✔SHAREWARE *VPIC* does one thing—display graphics files, but it does it very, very well. The latest version can display all common graphic formats (including BMP, GIF, LBM, PIC, PCX, and TARGA) and most not-so-common ones at up to 1024 by 768 resolution, 256-color super VGA. *VPIC* will also convert files between most of the formats it recognizes. It's available as VPIC46.ZIP on PC World Online and other on-line services. Bob Montgomery, 543 Via Fontana #203, Altamonte Springs, FL 32714-3172. Registration fee: $20.

WordPerfect Office 3.1 PC

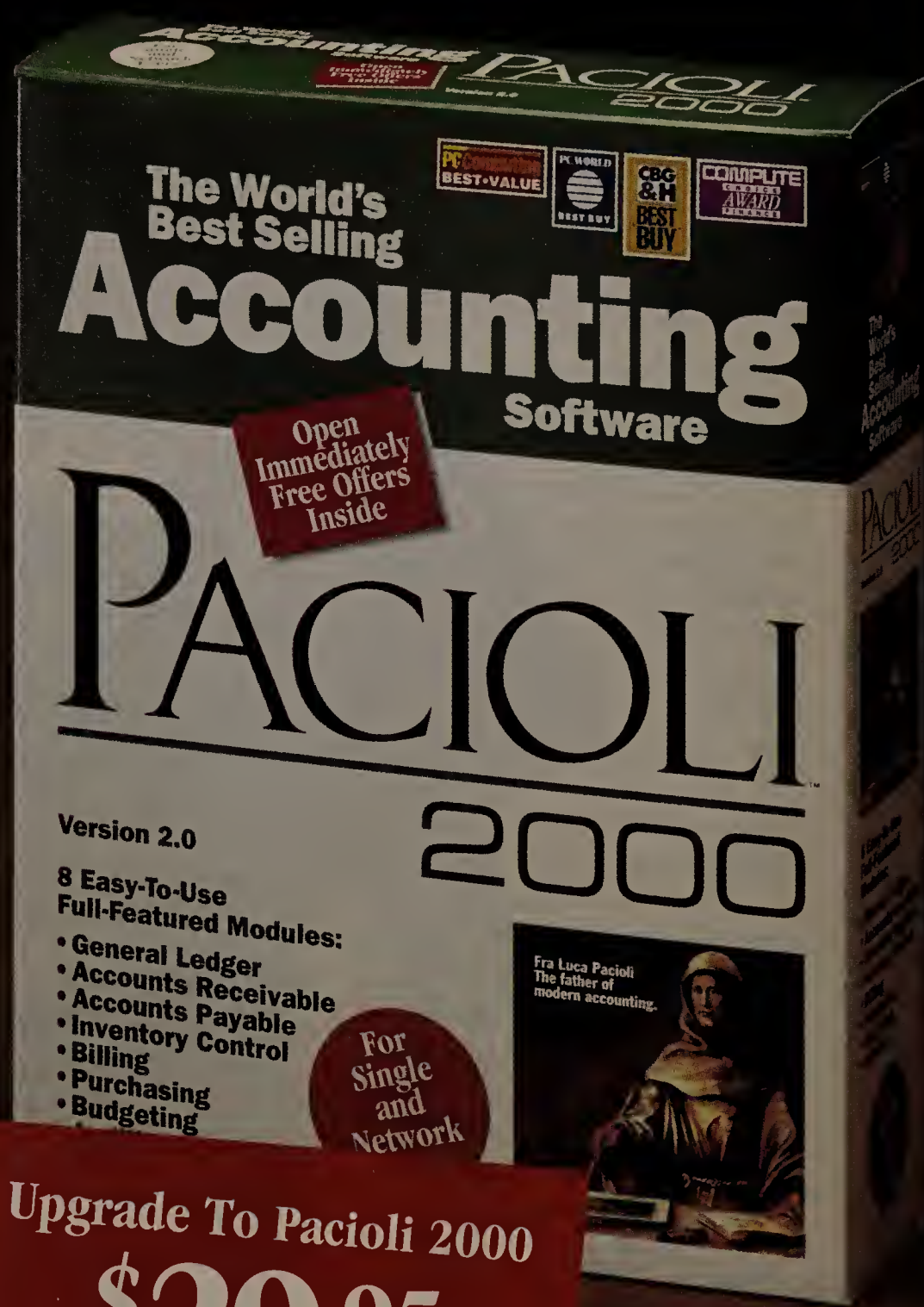
I'd probably have switched to *Windows* long ago if I weren't hooked on the *WordPerfect Office* shell, a task switcher I use to load all my apps and then hot-key between them. Unlike DOS 5.0's shell, *Office* can store inactive programs in expanded memory for near-instant switching, and it also lets you cut and paste data between programs. Like *PC Tools* and *SideKick*, *Office* is a grab bag so inexpensive that you need use only a few of its utilities to justify the purchase. Other *Office* modules I use are the flat-file data manager (I modified the basic address book template to suit my needs), the calculator, and the appointment calendar with its to-do list and pop-up alarm TSR. WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 800/451-5151, 801/225-5000, 801/222-5077 (fax). List price: $149.

Reader service no. 609

My C:\UTILS directory holds 60 programs, and I have another 20 in subdirectories. Overkill? Maybe—but I always have what I need.

Robert Lauriston is a contributing editor for PC World.

Nothing else is even close!



Dozens of professional reviewers including those from *CNN* and *The New York Times* have raved about Pacioli 2000.™ And *PC World, Computer Buyers Guide & Handbook, Compute* and *PC Computing* have awarded it top honors.

"Pacioli 2000 offers a host of small-business accounting features for just a third the price of comparable DOS packages. Its excellent explanation of accounting terms makes it appropriate for novices, while its flexibility and completeness make it suitable for a growing enterprise." — *PC Computing*
"Best Value," February 1992

If you compared the accounting systems under $400, as they did, you would say the same thing.

Now, the distance between Pacioli 2000 and the other accounting software just got greater.

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Circle 7 on reader service card

Minimum hardware requirements: IBM or compatible computer with 500kb of free memory available, hard disc, MS-DOS 2.1 or later (3.1 or later for networks), laser printer or 132 column dot matrix printer in compressed mode.

$7.50 shipping and handling fees apply to all products including free offers.
Georgia and Texas residents add appropriate sales tax.

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PCWP2

STEVE BASS'S *Favorite DOS Utilities*

DiskDupe Pro 3.39

It's no fun duplicating disks for my user group shareware library, but with *DiskDupe Pro*, I can whip through this tedious process with amazing speed—copying about 120 1.2MB preformatted floppies an hour. The program reads the master disk, creates an image in memory or—at a performance loss—on your hard disk, and then makes copies to floppies. It supports as many as four drives and all major PC formats, including 2.8MB 3½ inch. Micro System Designs, 10062 Miller Ave. #104, Cupertino, CA 95014; 408/446-2066, 408/446-2095 (fax). List price: $179.

Reader service no. 610

DOS System Utilities 1.0

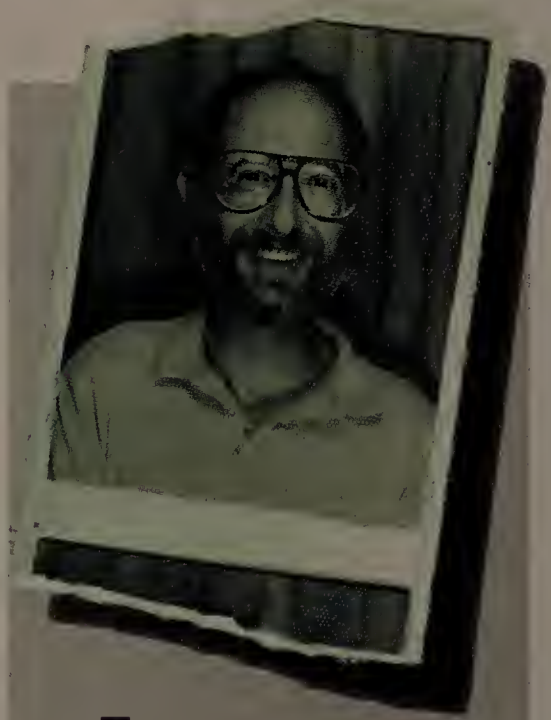
✔SHAREWARE The *DOS System Utilities* is a collection of indispensable utilities: There are programs to help you stop and read scrolling files; change, make, or remove a directory; let a batch file figure out the day of the week; move files between directories; schedule DOS commands to execute at a given time of day; delay a batch file's execution for a specified time; and more. It's available as DSUTIL.ZIP on PC World Online and other on-line services. Tom R. Donnelly, P.O. Box 3856, San Dimas, CA 91773; CompuServe ID: 73200,1323. Registration fee: $20.

KeyPress 3.0

✔SHAREWARE *KeyPress* lets you "stuff" the keyboard buffer with up to 16 characters when you load a program, giving you a short, simple opening macro. I use it in a batch file to get rid of time-wasting opening screens or to pop *cc:Mail Remote* over to Send when I need to call *PC World* and check E-mail. *KeyPress* is not a TSR, so you won't suffer the memory hit or compatibility problems that often accompany resident programs. It's available as KEYPRS.ZIP on PC World Online and other on-line services. Tony McNamara, 310/478-5409; CompuServe ID: 72477,2504. Registration fee: $15.

List Plus 7.6B

✔SHAREWARE *List* is simply the best file viewing and browsing utility I've ever used. It's not only fast and flexible, it also serves as a simple file manager, letting me copy, delete, and move files with ease. In addition, when you register your copy, you receive other slick utilities including *QDR*, a fast floppy reformatter. It's available as LIST76B.ZIP on PC World Online and other on-line services. Vernon D. Buerg, 139 White Oak Cir., Petaluma, CA 94952; 707/778-1811, 707/778-8728 (fax), 707/778-8944 (BBS). Registration fee: $25.



To get onto my hard disk, a utility program has to do more than simply make my computing life easier; it has to make me sit up and say, Wow!

Palert 2.0

✔SHAREWARE From my AUTOEXEC.BAT, *Palert* checks my hard disk every time I boot up and warns me if less than ten percent of my hard disk space is free. Ten percent is simply my choice; you can pick your own level, measured either in kilobytes or as a percentage of your hard disk's size. It's available as PALERT20.ZIP on PC World Online and other on-line services. Patri-Soft, P.O. Box 8263, San Bernardino, CA 92412; 714/369-9766 (BBS). Registration fee: $15.

Stacker 2.0

It seems as if every new *Windows* program wants a gazillion megabytes of hard disk space. Instead of spending hundreds on a new disk, I use *Stacker* to double my 105MB Hardcard. Once installed, *Stacker* works in the background, compressing and decompressing files and programs. The performance hit is minimal, and *Stacker*'s easier and cheaper than putting in a new hard disk. Stac, 5993 Avenida Encinas, Carlsbad, CA 92008; 619/431-7474, 619/431-5726 (fax). List price: $149.

Reader service no. 611

Supersonic Search Tool 5.3a

✔SHAREWARE *SST* is the fastest and most comprehensive multiple-disk searcher I've ever used. Not only does it find files, it'll search in almost any combination imaginable. For example, to find and display every TXT file on drives C: through G: that contains letter A, B, or C in the file name and is smaller than 2048K, you'd simply type **SST CDEFG:*.txt "[abc]" -lt2048.** Or you could add **-gf** to go to the subdirectory of the first match or **-v** to verify and delete the files. It's available as SST_53A.ZIP on PC World Online and other on-line services. Keith Ledbetter, 4240 Ketcham Dr., Chesterfield, VA 23832; 804/674-0780. Registration fee: $15.

Contributing Editor Steve Bass is a family therapist and president of Pasadena IBM Users Group.

Never Underestimate The Importance of Complete Protection.

—Ouch!

What good is last night's backup if you just lost everything you worked on all morning?

And even if you have a data recovery product, it won't help when you write over a file and then discover you want it back.

And virus protection software is great. If all you have is a virus.

There are dozens of ways to lose data. If you bought a different product to solve every conceivable problem it would cost a fortune. You need PC Tools™.

Only PC Tools gives you complete data protection in one integrated package. All 28 utilities in PC Tools were designed to work together to make using your PC safer, simpler and faster.

With our award-winning Backup you can back up data automatically to just about any device, including all the most popular tape drives. In DOS or Windows.

Need to repair a hard disk? Undelete or repair files? Locate missing data? With PC Tools it's no problem.

And our Virus Protection can detect over 800 viruses on both local and network drives. Before they can cause any damage.

But data protection isn't the only reason PC Tools is a 20-time award winner. You also get Central Point's award-winning PC-Shell,™ Desktop Manager, PC-Cache,™ Commute™ Remote Computing, and dozens of other indispensable utilities.

Call us for the complete story on PC Tools. It makes everything else as outdated as a suit of armor.

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COMPLETE DATA PROTECTION

Backup for Windows & DOS
Disk & File Repair
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SCOTT DUNN'S

Favorite Windows Utilities

Adobe Type Manager for Windows 2.0

WINDOWS While *Windows 3.1*'s TrueType scales fonts for my screen and printer, only *Adobe Type Manager* gives me access to the hundreds of PostScript Type 1 fonts. You once needed a PostScript-compatible printer to use these typefaces, but *ATM* brings them to dot matrix and LaserJet printers as well as to your monitor. Adobe Systems Inc., 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039-7900; 800/833-6687, 415/961-4400. List price: $99.

Reader service no. 612

hDC Power Launcher 1.0

WINDOWS *Power Launcher* is a potpourri of tools for launching applications and managing your desktop. The main program enables you to add custom submenus—for launching applications or macros—to your system menu. Other utilities let you reassign the effect of each mouse click, expand your desktop with a virtual screen, or create custom button palettes for launching different macros in each application. My fave is *Power Keyboard*, which lets me replace, for example, the " character with true typographer's quotation marks. A major upgrade is expected shortly. hDC Computer Corp., 6742 185th Ave. NE, Redmond, WA 98052; 206/885-5550, 206/881-9770 (fax). List price: $99.95.

Reader service no. 613

Launch 2.22

WINDOWS ✔SHAREWARE Seems like I'm always strapped for cash, system resources, or memory. That's why I like *Launch*, a program that's kind to all three and is my favorite Program Manager replacement. *Launch* starts my programs via a pop-up menu invoked by a hot key or by clicking anyplace on the desktop and permits a virtually unlimited number of submenus and menu choices for launching applications or data files. It's available as LAUNCH-.ZIP on PC World Online and other online services. Summit Research, Inc., 3321 Lauren Way, Lewisville, TX 75028; Registration fee: $39.95.

WinEdit 1.2j

WINDOWS ✔SHAREWARE Whenever I tweak an INI file or skim a README, I need a text editor that's fast and simple. But *Windows*' Notepad wimps out in basic features and file capacity while most *Windows* word processors overpower with sluggish magnificence. *WinEdit* seizes the middle ground. Though billed as a programmer's tool, *WinEdit* serves as a user's editor with search and replace, macro recording, and the trendy button bar. It's available as WED12J.ZIP on PC World Online and other on-line services. Wilson WindowWare, Inc., 2701 California Ave. SW #212, Seattle, WA 98116; 800/762-8383, 206/935-7129 (fax). Registration fee: $59.95.

Whiskers for Windows 2.0

WINDOWS One curiosity of *Windows* is its insistence that you use a mouse but its refusal to exploit the pointer's powers. *Whiskers* changes all that by letting you assign virtually any keystroke, keystroke combination, macro, or program to any mouse key or *chord* (mouse-key combination). Thanks to *Whiskers*, I can set up one chord in *Ventura Publisher* to zoom in and out, then use the same chord to extend a selection in *WinEdit*. *Whiskers* includes a macro recorder and can create pop-up menus. genSoft, 4122 128th Ave. SE, Bellevue, WA 98006; 206/562-1157, 206/562-0690 (fax). List price: $69.95.

Reader service no. 614

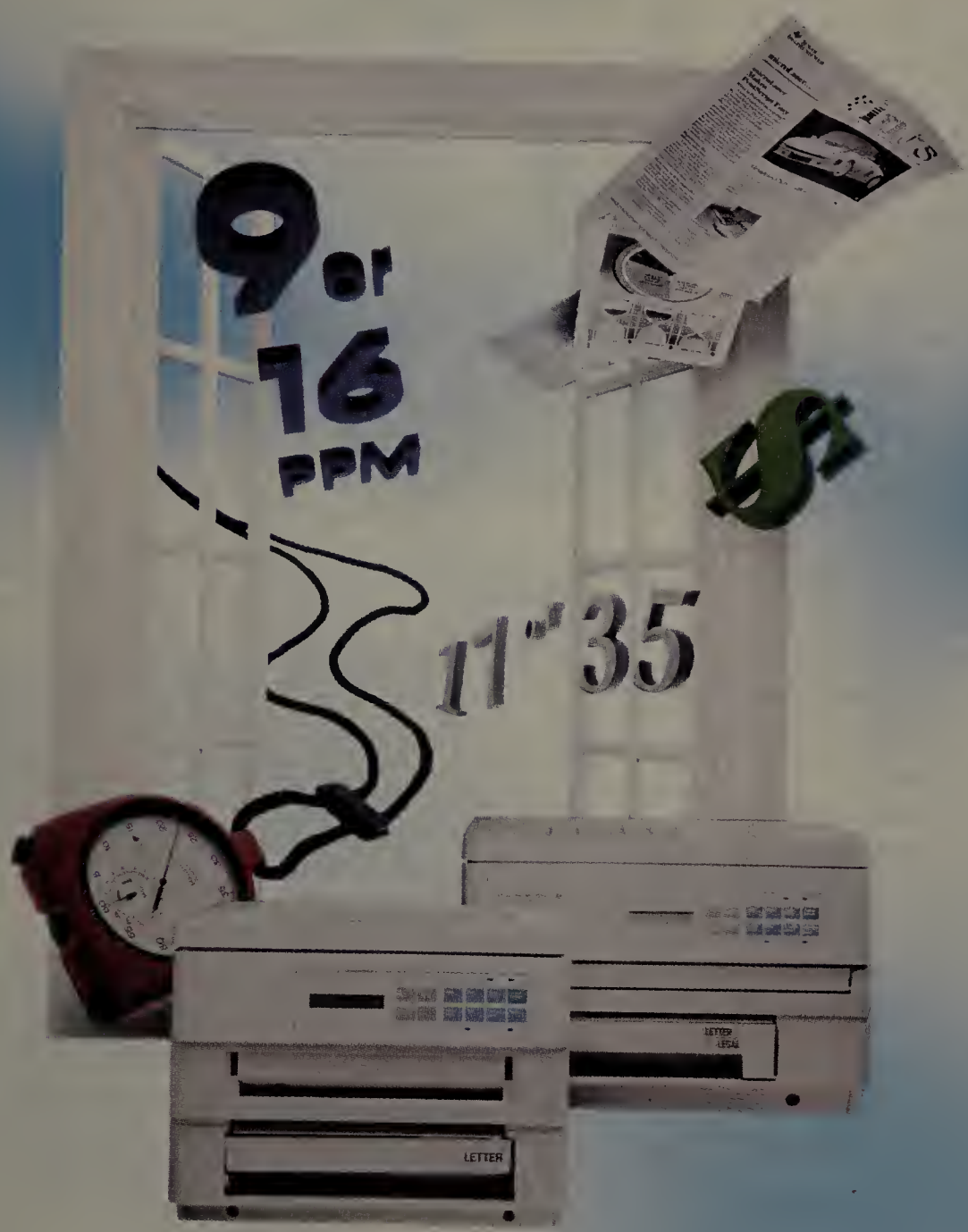
ZiPaper 1.3c

WINDOWS ✔SHAREWARE I admit it: I'm a wallpaper junkie. But who can afford to let those bloated BMP files soak up precious disk space? *ZiPaper* saves me by storing those pics in a compressed format (ZIP or LZH) and randomly extracting and displaying one with a DOS-prompt command—with no repeats until I've seen them all. The more powerful *ZiPaperPlus+*, available by the time you read this, will be able to change wallpaper while *Windows* is running. It's available as ZIPAPR.ZIP on PC World Online and other on-line services. Daniel Thomas, 2301 N. Huron Cir., Placentia, CA 92670; 714/524-5625. Registration fee: $15 for *ZiPaper*, $29.95 for *ZiPaperPlus+*.

Windows gives DOS a pretty face and big muscles, but a lot is left out. Here are some utilities that give Windows some extra oomph.

Scott Dunn is the coauthor of 101 Windows Tips *(Peachpit Press, Berkeley, California, 1991).*

Open new windows with TI microLaser™ printers.



And get powerful fonts and graphics, ease of use and more speed than ever.

By now you've heard how fast and easy Microsoft® Windows™ makes it to tap all that PC power you've got on your desk.

Well now there's an affordable, easy way to put that power on paper — microLaser from Texas Instruments.

Right out of the box, microLaser comes with what you need to print the dazzling pages of text and graphics you've dreamed of.

Just plug it in and go. POSTSCRIPT

That's because microLaser PS models come with PostScript® software from Adobe® and the memory it takes to use it. Plus you get your choice of either 17 or 35 scalable fonts, starting at just $1,399*.

New model. More speed. Same price.

When it comes to print speed, the new microLaser Plus zips along at 9 ppm. If you need a shared printer solution, turn to the 16 ppm microLaser XL.

If all that isn't enough, just look at what else you get with microLaser. It's the smallest printer in its class. It handles more paper and envelopes in more ways. And it supports more than 4,000 software packages, including your Windows applications.

So when you add it all up, you'll understand why the power of your ideas needs the power, convenience and economy of microLaser. Let microLaser open new windows for you.

For the name of the nearest dealer, call **1-800-527-3500.**

TEXAS INSTRUMENTS

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RICHARD SCOVILLE'S

Favorite Spreadsheet Utilities

@Mail 1.0

@Mail is a *1-2-3 2.x* add-in that lets you send and receive network E-mail to and from such MHS-compatible programs as *DaVinci* or *Right-Hand Man* from inside your worksheet. You can maintain distribution lists, request receipts, password-protect your messages, attach DOS files, and so on. You can even copy a range from your worksheet into an outgoing message, or have *@Mail* alert you when an incoming message arrives. Beyond Inc., 38 Sidney St., Cambridge, MA 02139; 800/845-8511, 617/621-0096 (fax). List price: starter kit (server and one user) $129.95, additional nodes $79.95 each with volume discount.

Reader service no. 615

Braincel 1.1

WINDOWS I didn't think it was possible, but in *Braincel*, an eerily powerful artificial intelligence *Excel* add-in, I've found a program that I can teach to think for me. Give *Braincel* a worksheet that displays some of your past decisions, spend some time "training" it, and the program will be able to make respectable judgments that are consistent with your own. This is useful for jobs where you make decisions with a combination of numerical data and guesswork. Promised Land Technologies, Inc., 900 Chapel St. #300, New Haven, CT 06510; 800/243-1806, 203/624-0655 (fax). List price: $249.

Reader service no. 616

Budget Express 1.1

Budget Express can automatically insert group and grand totals, collapse and password-protect; detail rows; automatically set up column headings in monthly patterns; and generate columns of monthly, quarterly, or yearly totals. This dandy *1-2-3 2.x* add-in can also consolidate data from multiple worksheets and help with that painful what-if analysis. Symantec Corp., 10201 Torre Ave, Cupertino, CA 95014; 800/441-7234, 408/252-4694 (fax). List price: $149.

Reader service no. 617

My cousin Ralph, the plumber, says that "the secret to doing a good job fast is having the right tool." Here are my proven favorites.

Formula Editor 1.1

If you only buy one *1-2-3 2.x* add-in, get the *Formula Editor*—it has saved me hours of frustration. Bring up the add-in and you get the current formula in a full-screen display, with syntax errors shown in contrasting colors. The superbly organized menus help you specify absolute cell addresses, switch back to the worksheet to select a cell or name a range, and use references to select @functions, range names, and operators. If your formula gets too complex, the *Formula Editor* will help by highlighting parenthesized expressions and by calculating the numeric values of each of its component expressions. Funk Software, 222 Third St., Cambridge, MA 02142; 617/497-6339, 617/547-1031 (fax). List price: $99.95.

Reader service no. 618

LTpass 3.1, XLpass 3.1

If you protect your *1-2-3, Quattro Pro,* or *Excel* data by saving a worksheet with a password, what do you do if you forget the password? *LTpass* for *1-2-3* and *Quattro Pro* files and *XLpass* for *Excel* files can decrypt your worksheets with a combination of educated guessing and brute force, retrieving the password you lost. This is great news for the absent-minded, but it also means that your files are ultimately less secure. AccessData, 87 East 600 South, Orem, UT 84058; 801/224-6970, 801/224-6009 (fax). List price: $185.

Reader service no. 619

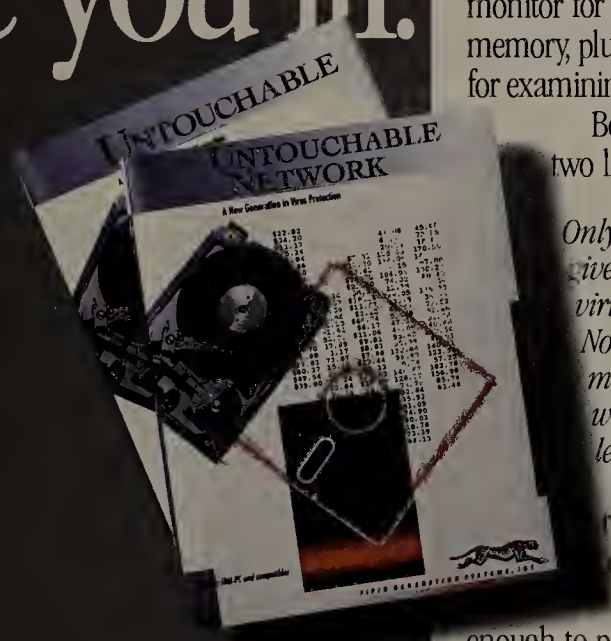
Macro Editor/Debugger 1.05

This program is a regular Swiss army knife for anyone who builds *1-2-3 2.x* macros. It lets you view and edit macros in a three-column layout (Range names, Macros, and Comments) at the bottom of your screen while you watch what they're doing at the top. With *ME/D* you can paste range names into your macro commands, insert or delete rows without disturbing adjacent columns, or undo your last edit with a single keystroke. And for debugging, *ME/D* lets you step through a macro one keystroke or cell at a time, as well as insert breakpoints. I give this dandy little helper five stars. Personics, 63 Great Rd., Maynard, MA 01754; 508/897-1575, 508/897-1947 (fax). List price: $199.95.

Reader service no. 620

Richard Scoville is a contributing editor for PC World.

Paying again and again for virus protection is enough to make you ill.



Frankly, paying anything at all is pretty nauseating.

But that's nothing compared to the feeling you get in your stomach when a drive full of data goes down the drain.

So you pay.

Then you pay again. For upgrades. Or quarterly "updates."

But even that doesn't buy you much peace of mind. Because each new day brings an average of six new viruses into the world.

Which means all anti-virus programs are inherently obsolete.

Except one.

Introducing Untouchable.™ The only software in the world that gives you 100% protection.

Today.

And tomorrow.

Like other anti-virus software, Untouchable is equipped with a TSR monitor for patroling your system memory, plus a scanner/remover for examining the files on your disk.

Between them, these first two lines of defense can recognize and obliterate hundreds of the little buggers — enough to protect you from 95% of the potential carnage.

Only Untouchable Network gives you centralized virus protection. Now you can install, monitor and control without having to leave your seat.

If you find that statistic reassuring, then you probably like the odds in Russian Roulette.

If you don't, you'll want to know that Untouchable is equipped with a unique *third* line of defense, which has been mathematically proven to be, well, untouchable.

Instead of looking for viruses, this third line of defense looks for *changes in your executable and system files.*

If the change is but a single byte, Untouchable will spot it and, using our patent-pending recovery technique, reconstruct the file to its original state.

The process is known as Generic Differential Detection, and certain other programs claim to perform it, too.

But only Untouchable calculates file signatures using not one, but two proprietary algorithms that can't be reverse-engineered.

Only Untouchable guarantees 100% safe recovery of infected files. (Unlike other programs that proudly generate corrupted files, Untouchable knows when the jig is up and doesn't attempt recovery.)

Only Untouchable can provide centralized network virus protection. In fact, Untouchable Network has enough virus alerts and reporting mechanisms to settle the stomach of even the most nervous Netware® administrator.

And only Untouchable is backed by our vaunted 24-hour toll-free technical support and a one-year money-back guarantee.

If you're worried about viruses — and you should be — don't reach for the Maalox.® Reach for the phone. Dial 1-800-388-0362.

You'll feel better right away.

FIFTH GENERATION SYSTEMS, INC

GEORGE CAMPBELL'S *Favorite Word Processing Utilities*

FontManager 2.0, PFMEdit 1.0

WINDOWS ✔SHAREWARE I'm a certifiable font addict. I've accumulated hundreds of PostScript Type 1 fonts, which I use with *Adobe Type Manager* (see "Scott Dunn's Favorite Windows Utilities"), but both *ATM* and *Windows* limit the total number of fonts I can use at one time. Dennis Harrington's *FontManager*, which lets me group fonts into logical sets and switch between them, is a lifesaver. I also occasionally like to change a font's name or alter its kerning tables, and that's where *PFMedit*, also by Dennis Harrington, comes in. You can't beat the price: Both programs are absolutely free! They're available as FM202.ZIP and PFMEDT.ZIP on PC World Online and other on-line services. Mr. Harrington prefers not to be called.

Grammatik 5, Grammatik 5 for Windows

WINDOWS Reference Software's *Grammatik* programs remain my favorite grammar and style checkers for both DOS and *Windows*. To the already outstanding feature set, these new versions add additional writing style formats, support for the latest word processor versions, additional grammar rules, and the capability to spot instances when you use the same word too many times. Since you can customize both programs to suit your own writing style, corporate image, or personal quirks, you'll always have exactly the grammar and style checking tools you need. Reference Software Int'l, 330 Townsend St., San Francisco, CA 94107; 800/872-9933, 415/541-0509 (fax). List price: $99 for either version.

Reader service no. 621

Microsoft Bookshelf for Windows, 1991 Edition

WINDOWS After finally taking the CD ROM plunge, I've found the 1991 Edition of *Microsoft Bookshelf for Windows* to be the best CD around. I can pop it up anytime to consult an atlas, almanac, or thesaurus. I can dig up facts in an encyclopedia, look up words in the dictionary, or examine two quotation references. The *Bookshelf*'s capability to search for items in all its "books" at once makes it invaluable, and you can cut and paste its information into any document. While the disk runs on any *Windows*-capable PC with a CD ROM drive, on a multimedia-capable machine you can get animated illustrations, word pronunciations, and more. Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399; 800/426-9400, 206/882-8080. List price: $149.50.

Reader service no. 622

Today's word processors are great, but they're not great enough. Here are a few choice tools to make them even better.

Windows Word for Word 5.0

WINDOWS Although most *Windows* word processors can import documents from other word processors, their list of import filters is often limited. That's why one of my favorite add-ons is Mastersoft's *Windows Word for Word*. It lets me translate documents to and from just about any word processor, including such obscure programs as *IBM Writing Assistant 1.0* and *PeachText 5000*. The entire operation is completely transparent in *WinWord*; I barely know that *Word for Word* is there. If you don't use *Windows*, you can get a *Word for Word* version for DOS, Macintosh, OS/2, and most other platforms. Mastersoft, Inc., 6991 E. Camelback Rd., Ste. A320, Scottsdale, AZ 85251; 602/277-0900, 602/970-0706 (fax). List price: $79.

Reader service no. 623

Word for Windows Office Power Pack 2.0

WINDOWS ✔SHAREWARE Much as I love *Word for Windows 2.0*, there are still a few things it can't do, and Pinecliffe's *Office Power Pack* helps fill the gaps. First of all, there's a collection of powerful, self-installing *WinWord* macros, including an improved file manager, a clock, better word and character counters, and a great viewer for symbols and other unusual characters. And the macros aren't everything: There's a wonderful tool for modifying *WinWord*'s boring, gray tool bar icons—I've colorized all the icons and drawn some of my own. Then there's an envelope-printing tool that beats *WinWord*'s built-in feature by a mile, even handling logos and postal bar codes. It's available as WOPR20.ZIP on PC World Online and other on-line services. Pinecliff Int'l, 11900 Grant Pl., Des Peres, MO 63131; 800/659-4696. Registration fee: $49.95.

George Campbell is a contributing editor for PC World.

The Streak Continues!

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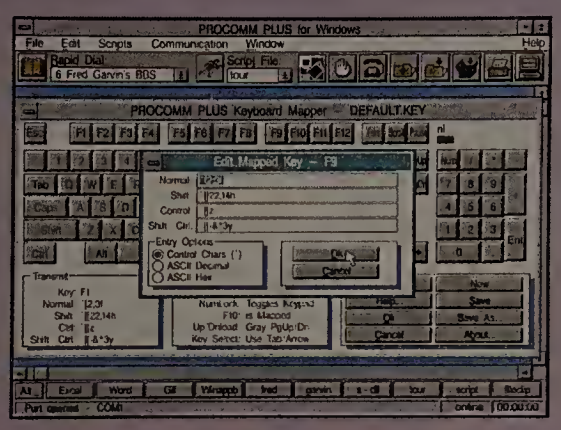
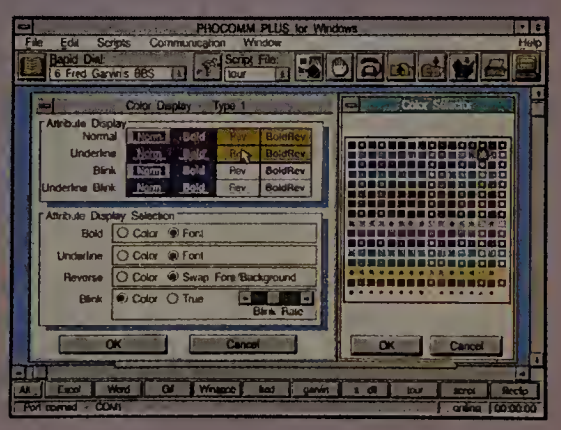
PROCOMM PLUS has opened the eyes of the world to a superior communications package. Now, people with their sights set on communicating with Windows have a choice just as clear. PROCOMM PLUS for Windows. The power and ease of use of PROCOMM PLUS combined with the elegance of Windows. Look for it now at your software dealer. If you currently own PROCOMM PLUS, upgrade to PROCOMM PLUS for Windows for just $69.00 by calling 1.800.326.4999. And discover for yourself why PROCOMM PLUS for Windows leaves the competition in the fog.





DATASTORM

DATASTORM TECHNOLOGIES, INC.

P.O. Box 1471 • Columbia, MO 65205 • 314.443.3282

Circle 280 on reader service card

CELESTE ROBINSON'S *Favorite Data Base Utilities*

Data Flow 1.0

When I first looked at *DataFlow,* I thought "It's pretty, but will I ever use it?" Within a week, I was ecstatic to have found this program. *DataFlow* lets you view *dBASE, Paradox,* and ASCII files, easily searching for and comparing data. You can also link files and freely rearrange the way data is displayed on screen without changing the underlying file structure. Information Management Systems, Inc., 15760 Ventura Blvd., Encino, CA 91436; 818/784-6890, 800/447-4447, 818-784-6552 (fax). List price: $89.95.

Reader service no. 625

Data Junction 4.1

Not only can you move data between an incredible number of file formats with *Data Junction,* you can also edit the data while you're translating it, tweaking your information as you convert it. The three editions vary mainly in how many data types they support, with the Advanced Edition offering some you've probably never heard of. Tools & Techniques, Inc., 1620 W. 12th St., Austin, TX 78703; 512/482-0824, 800/444-1945, 512/482-0976 (fax). List price: Standard Edition $99, Professional Edition $199, Advanced Edition $299.

Reader service no. 626

dbPublisher Pro+ 3.1, dbPublisher for Ventura

I used to wish I could create reports as pretty as what I get with *Ventura Publisher.* Now I can. *dbPublisher* lets you design high-quality reports with data from *dBASE, Paradox, R:BASE, Q&A,* and others. You can even include graphics images stored in your data base. To get you started, the product has templates for such common report forms as catalogs and phone lists. *Ventura* users can save money with *dbPublisher for Ventura.* Digital Composition Systems, Inc., 1715 W. Northern Ave., Phoenix, AZ 85021; 602/870-7667, 800/527-2506, 602/870-7668 (fax). List price: *dbPublisher/Pro+* $495, *dbPublisher for Ventura* $195.

Reader service no. 627

GraphBase 1.0

This is a perfect product for easily turning DBF files into nice-looking graphs. *GraphBase* lets you design a variety of charts, including pie, stacked bar, line, and step, as well as mixed-type graphs. *GraphBase* supports Epson, IBM, and other dot matrix printers as well as HP and PostScript lasers. You can vary the size and font of graph titles and play with labels, colors, and fill patterns. *GraphBase* also lets you edit and filter data before it's graphed. Softwell, P.O. Box 3333, Palmer, PA 18043; 215/258-3241, 215/252-8579 (fax). List price: $99.95.

Reader service no. 628

You can probably handle all your data management needs with dBASE IV or Paradox, but why work that hard if you don't have to?

nimbus Report Writer for Paradox 1.0

Paradox's reputation as an easy-to-use program has never been helped by its report generator, which doesn't let you move or copy fields nor offer a quick way to navigate around the screen. The fully mousable *nimbus Report Writer for Paradox* has no such shortcomings and lets you create much nicer-looking reports than *Paradox* ever has. Among the other goodies: *nimbus* lets you include query criteria in your report specification, and place graphic objects on your pages. Once your *nimbus* report is designed, you can print it out from *nimbus* itself, from DOS, or in *Paradox.* Nimbus Software, Inc., 11080 S.W. Allen Blvd. #300, Beaverton, OR 97005; 800/788-5999, 503/626-0595, 503/646-7195 (fax). List price: $249.

Reader service no. 629

PlayRight Pro 3.0

If you've written as many PAL scripts as I have, you've probably learned to hate the *Paradox* Script Editor. *PlayRight Pro,* a text editor designed for *Paradox* users, gives you block operations, easy cursor movement, and other features that the *Paradox* editor lacks. You can open multiple script files, move blocks between files, check on *Paradox* table structures, and even look at the layout of your reports and forms without leaving the editor. *PlayRight Pro* also has extensive PAL reference material, so you can easily check the syntax of a command. I recommend you set up *PlayRight Pro* as *Paradox*'s default editor. PAL by Example, 1 Newark St. #5B, Hoboken, NJ 07030; 800/262-8069, 201/795-9237 (fax). List price: $149.95.

Reader service no. 630

Celeste Robinson is a contributing editor for PC World.

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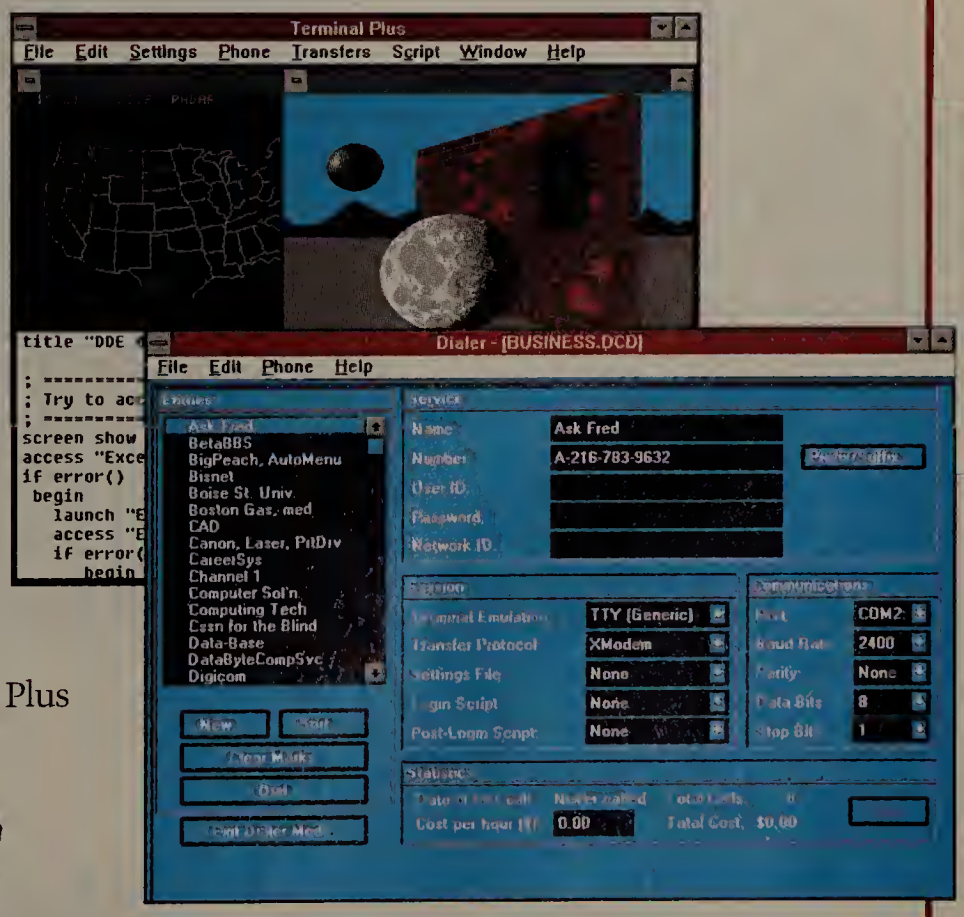

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RICHARD JANTZ'S *Favorite Desktop Publishing Utilities*

AllType 1.1

WINDOWS My font collection includes scalable outlines in all sorts of formats, and not every program I have can handle every type of font. That's why I like *AllType*, a universal typeface conversion utility. You can install *AllType* as a menu-driven DOS program or as a *Windows*-based utility and convert scalable typefaces to and from a variety of formats, including Adobe PostScript Type 1 and Type 3, Agfa Intellifont, Bitstream Speedo, Nimbus Q, Royal URW, and *Windows 3.1* TrueType. If you don't know what type you need, tell *AllType* the applications or font managers you'll be using, and it'll choose the conversion format. Atech Software, 5964 La Place Ct. #125, Carlsbad, CA 92008; 800/786-3668, 619/438-6898 (fax). List price: $79.95.

Reader service no. 631

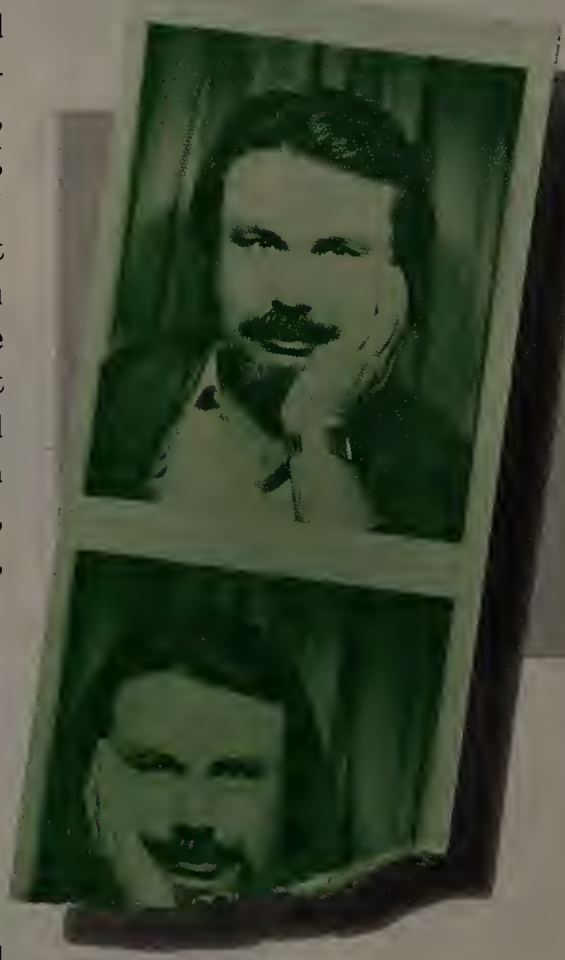
Corel ArtShow '91

WINDOWS If you're serious about computer graphics, you may already use a CD ROM drive to access vast libraries of clip art, scanned photos, or fonts. Do yourself a favor and add *Corel ArtShow '91* to your CD ROM collection. This fair-priced utility includes over 1200 high-quality *Corel Draw* images, as well as an image-compression utility. You can run *ArtShow* inside *Windows* or with an included DOS-based image viewing program. If you have *Corel Draw*, you can examine these drawings and learn exactly how the pros do it; but if not, the drawings will still stir your imagination. Corel Systems Corp., 1600 Carling Ave., Ottawa, Ontario, Canada K1Z 8R7; 800/836-6366, 613/728-9790 (fax). List price: $99.

Reader service no. 632

Index 1.4

SHAREWARE Hey, *Ventura Publisher* users, stop groaning every time you have to index a book, technical report, or other large document. Just tell *Index* all the terms you want indexed and it will search through your document, find every occurrence of the terms, and insert the proper codes for you. Then use *Ventura* to generate the index and format the results. It's available as IND14E.ZIP on PC World Online and other on-line services. Trinity Software, 13550 Frost Dr., Nokesville, VA 22123; 703/791-2576, 703/791-4250 (fax). Registration fee: $79.



Want the truth? My PC is a many-headed Hydra that craves software, and utilities are a cheap way to feed it.

PictureEze 2.0

WINDOWS *PictureEze* can help you stay sane in a world where multiple PC graphics formats resemble a high-tech Tower of Babel. With this graphics file conversion utility, you can load and view an extensive range of graphic file formats, enhance color, and crop, flip, and rotate images—then save the final picture in any one of those formats. Or you tell *PictureEze* in what application you'll be using the final image, and the program will select the format you need. A separate screen-capture program that also supports scores of graphics formats is included. Application Techniques, Inc., 10 Lomar Park Dr., Pepperell, MA 01463; 800/433-5201, 508/433-8466 (fax). List price: $149.

Reader service no. 633

TypeAlign 1.0

WINDOWS When people tell me they don't have a sophisticated graphics package—let alone the time, money, or talent—to produce jazzy type effects for their documents and presentations, I recommend Adobe's *TypeAlign*. Working in conjunction with *Adobe Type Manager*, *TypeAlign* lets you stretch, twist, rotate, and squish PostScript Type 1 fonts into eye-opening designs, all via easy-to-use drawing tools. The final image can be printed directly or exported as a file (in EPS, WMF, or AI format) that you can import into your favorite publishing, word processing, illustration, or presentation program. Adobe Systems Inc., 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039-7900; 800/833-6687, 415/961-3769 (fax). List price: $99.

Reader service no. 635

Contributing Editor Richard Jantz is a computer publishing and presentations consultant in Berkeley, California.

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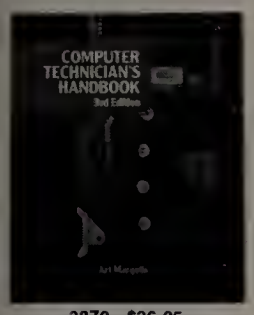

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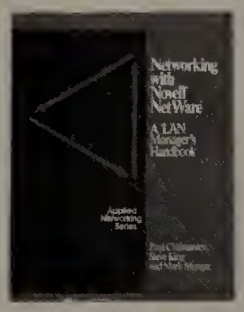

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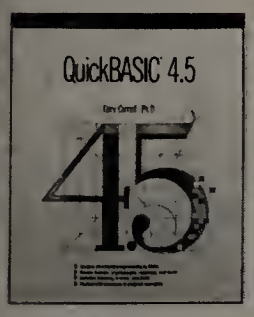

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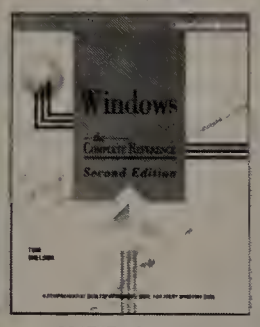

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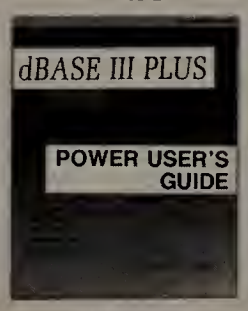

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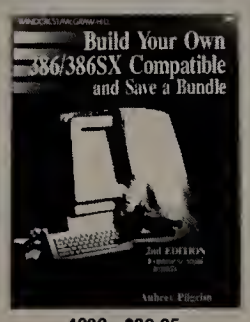

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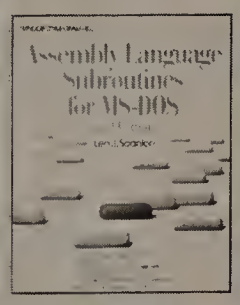

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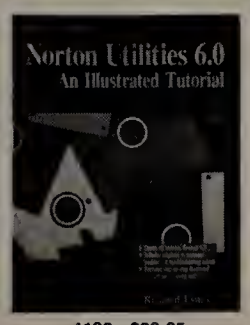

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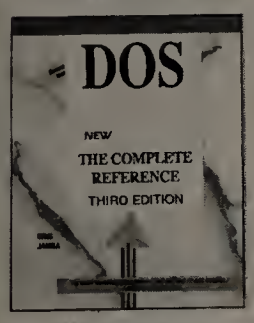

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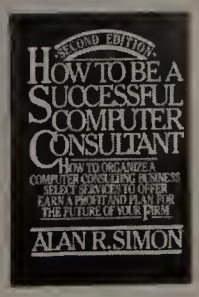

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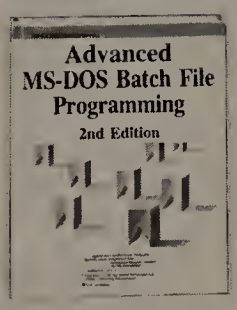

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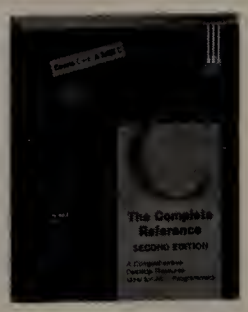

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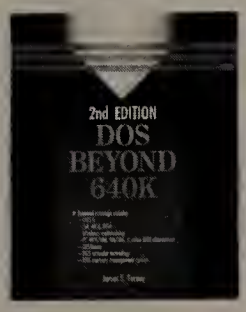

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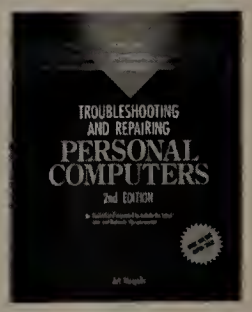

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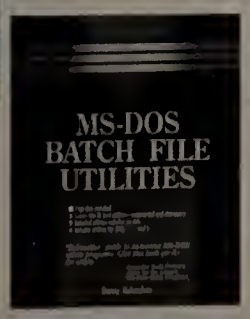

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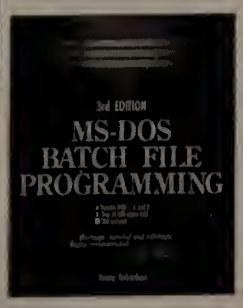

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JUDY HEIM'S *Favorite Communications Utilities*

D'Compress 1.0

WINDOWS

Formerly *ZIP Manager*, this spiffy front end to *PKZip* allows you to run that and other file compression programs, plus virus scanners, from a single *Windows* menu. You can create archive files in multiple windows and view their contents with mouse-dragging ease. Once shareware, the program is now sold commercially. Moon Valley Software, Inc., 706 E. Bell Rd. #112, Phoenix, AZ 85022; 602/375-9502, 602/993-4950 (fax), 602/375-0531 (BBS). List price: $99.95.

Reader service no. 636

The Desktop Set 3.0

WINDOWS This classy dialer-phonebook-calendar combo may be the *SideKick* of the nineties. Not only does it offer phone logs, custom dialing, memory dialing, pop-up reminders, and hot links to other utilities, it also lets you dial any number on a *Windows* program screen. A new version, which may be out by the time you read this, will support pocket pagers, interface with your *Windows* fax software, and allow you—with a special phone company–supplied device—to find out who's calling you. Okna Corp., P.O. Box 522, Lyndhurst, NJ, 07071; 201/460-0677, 201/507-8725 (fax). List price: $149, or $89 when purchased direct from Okna Corp. (Prices may change with the new version.)

Reader service no. 637

The DownLoader 2.2a

Nothing is more tedious than downloading stock quotes, and *The DownLoader* lets you do away with keying in ticker symbols on line. *DownLoader* stores all your ticker symbols and dials up any of seven major quote vendors—including Dow Jones, Warner Data, CompuServe, and two broadcast services—nabs the quotes, and stores them in ASCII or *Metastock* format. It has a terminal mode so you can go on line yourself. It downloads only closing and historical quotes—up-to-the-minute quotes are not supported. Equis Int'l, 3950 South 700 East #100, Salt Lake City, UT 84107; 800/882-3040, 801/265-3999 (fax). List price: full version $195, Warner Data–only version $69.

Reader service no. 638

The best communications utilities are the ones that take a chore that is simple to do in concept and make it simple to do in reality.

PFSDial 1.04

SHAREWARE This ultra-customizable, incredibly inexpensive, RAM-resident dialing program lets you dial any number on your PC's screen, including numbers split across multiple lines or spelled out with letters (like 1-800-GOODBUY). It can even log calls and navigate PBXs, calling card numbers, and international operators. But it won't work with *Windows* or other graphics programs. It's available as PCFDIL.ZIP on PC World Online and other on-line services. Barn Owl Software, P.O. Box 74, O'Fallon, IL 62269; 800/788-0787, 618/632-2339 (fax). Registration fee: $19.

PKZip 1.1

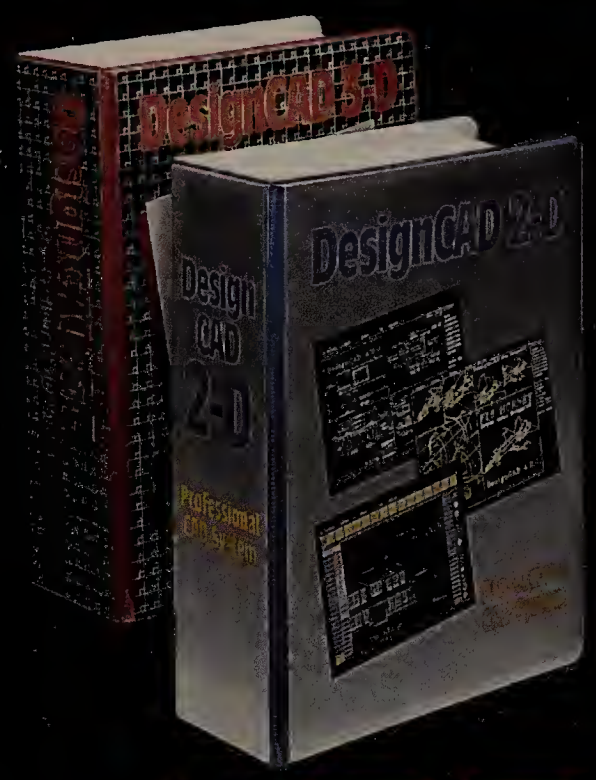
SHAREWARE Compactness, simplicity, and speed are the virtues of this file compression program, a favorite on on-line services and BBS's. Many of the files you'll download from CompuServe, PC World Online, or other services come in the ZIP format, and *PKZip* will turn them into the files you need. By compressing files before you upload them, you can cut your on-line time roughly in half. This is one of those rare cases where a shareware program has become an industry standard. It's available as PKZ110.EXE on PC World Online and other on-line services. PKWare, Inc. 9025 N. Deerwood Dr., Brown Deer, WI 53223; 414/354-8699, 414/354-8559 (fax). Registration fee: $47.

PDL: Prodigious Down Load

SHAREWARE Daily ticker prices on Prodigy are one of the best bargains on line, but Prodigy's software won't let you copy them to disk. This very inexpensive shareware program can do what the IBM/Sears software can't—grab up to 1000 ticker prices and write them to your disk. You can even set it up to log on when you're not around. There are other Prodigy stock quote downloading programs, but this is the easiest to set up. It's available as PDL31.ZIP on PC World Online and other on-line services. FlexSoft Corp., 7172 Regional St. #276, Dublin, CA 94568; 510/829-9733. Registration fee: $20.

Judy Heim is a contributing editor for PC World.

GO FIGURE!



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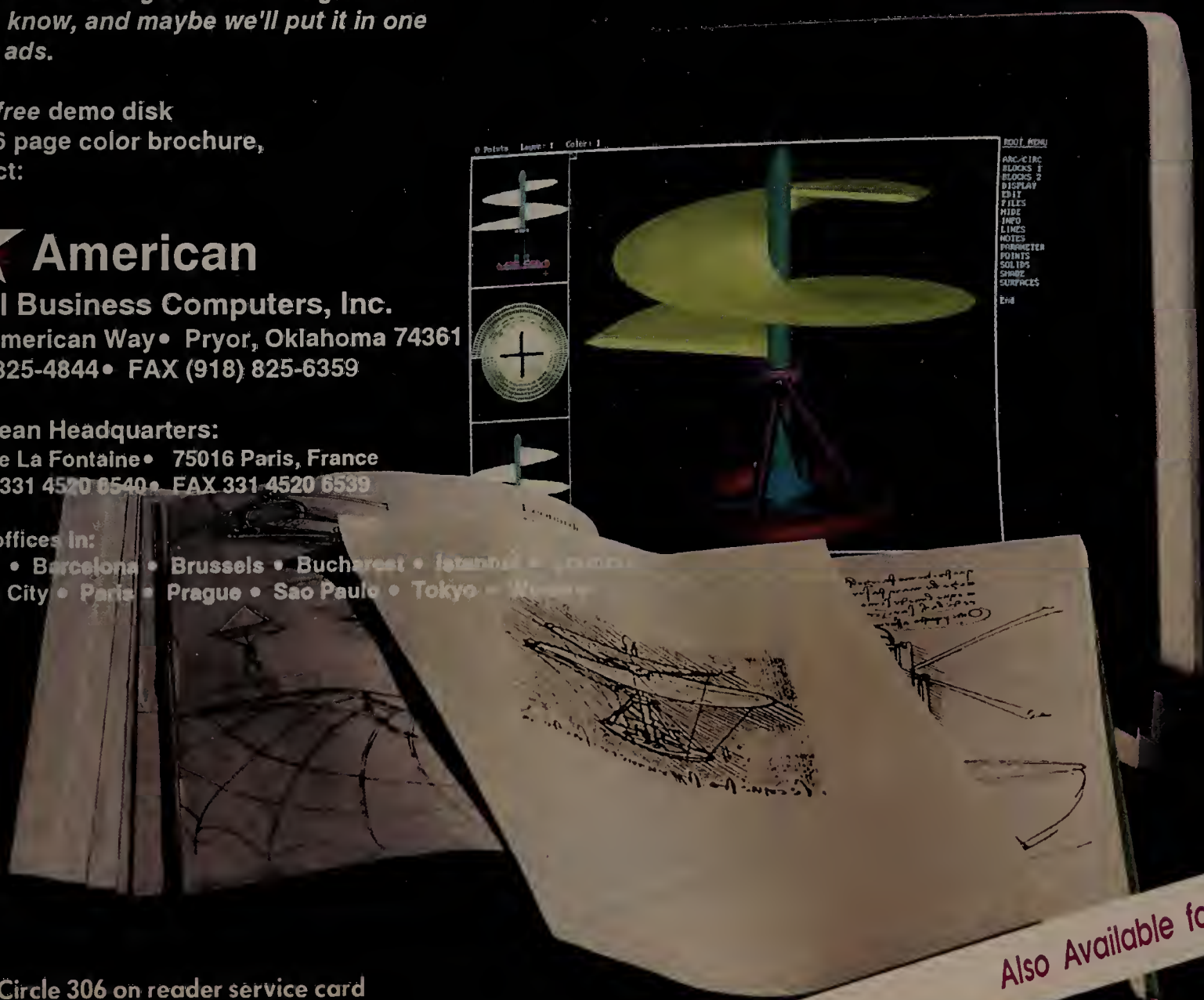

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BRETT GLASS'S *Favorite Programming Utilities*

DeltaFile 1.5

How do you send updates to your users? Mailing disks is expensive; posting to a BBS encourages piracy and can force users to run up big phone bills. Good thing there's *DeltaFile*—a utility that lets you send just the changes, saving disks and download time and foiling pirates. *DeltaFile* examines the old and new versions, then creates a single EXE file that performs *all* the updates in one fell swoop. hyperkinetix, 1801 Irvine Blvd., Ste. M, Tustin, CA 92680; 714/573-2260, 714/573-2297 (fax), 714/935-0832 (BBS). List price: $249.95.

Reader service no. 639

MicroHelp Muscle 1.50, Communications Library 2.10, VBTools 2.1

WINDOWS If you're attempting to use *Visual Basic* to write any but the simplest "toy" programs, you'll find these assembly-language libraries extremely helpful. *MicroHelp Muscle* is a potpourri of disk, directory, keyboard, date/time, math, array, and string routines. The *Communications Library* lets you write programs that perform asynchronous communications. And *VBTools* contains an assortment of *Visual Basic* custom controls, graphics effects, and useful subroutines. MicroHelp, 4636 Huntridge Dr., Roswell, GA 30075; 404/594-1185, 404/594-9629 (fax). List price: *MicroHelp Muscle* $189, *Communications Library* $149, *VBTools* $189.

Reader service no. 640

Object Professional for C++ V 100

As a die-hard Pascal programmer, I've been using TurboPower Software's superb *Turbo Pascal* tools for years. But until recently, C++ programmers had no way to take advantage of these handy utilities. Enter *Object Professional for C++*. Included are C++ classes that allow you to create mouse-driven text-based user interfaces, with overlapping or tiled windows, multilevel menus, powerful text editors, and data entry forms with built-in data validation. There's even an interactive screen builder and tester. TurboPower Software, P.O. Box 49009, Colorado Springs, CO 80949; 719/260-6641, 719/260-9136 (fax). List price: $249.

Reader service no. 641

Resource Workshop

WINDOWS When I want to design or modify *Windows* applications, I rely on Borland's *Resource Workshop*, the definitive *Windows* resource editor. *Resource Workshop* lets you create and edit menus, dialogs, icons, fonts, cursors, string tables, and bit maps—instantly generating resource files for your *Windows* programs. It won't work with programs written in *Visual Basic*, however. *Resource Workshop* comes with several Borland compilers and is also sold separately. Borland Int'l, 1800 Green Hills Rd., Scotts Valley, CA 95067; 408/438-5300, 408/439-9100 (fax). List price: $49.95.

Reader service no. 642

Soft-ICE/W

WINDOWS *Soft-ICE/W* is a powerful source-level debugger that runs in *Windows'* 386-enhanced mode. Along with your *Windows* programs, it can debug anything from device drivers to TSRs running in DOS. You can even use *Soft-ICE/W* to trace through the internal code of *Windows* itself! *Soft-ICE/W* has a text-based user interface and must be controlled from the keyboard. NuMega Technologies, Inc., P.O. Box 7780, Nashua, NH 03060; 603/889-2386, 603/889-1135 (fax). List price: $386.

Reader service no. 643

WINDOWS.TXT 1.2

WINDOWS By providing a text-mode implementation of much of the *Windows* API, WINDOWS.TXT lets you write programs that behave identically under DOS and *Windows*, an approach that isn't practical for all programs, but is still often worthwhile. WINDOWS.TXT includes a hypertext help system, a dialog editor, a resource compiler, and a compatibility checker that helps you find parts of an existing *Windows* program that won't work in text mode. So if your boss asks you to write a single application that runs under both DOS and *Windows*, this package might be your deliverance. Interactive Engineering Corp., P.O. Box 7022, Boulder, CO 80306; 303/440-7674, 303/444-7206 (fax). List price: $396 ($695 with source).

Reader service no. 644

Brett Glass is a contributing editor for PC World.

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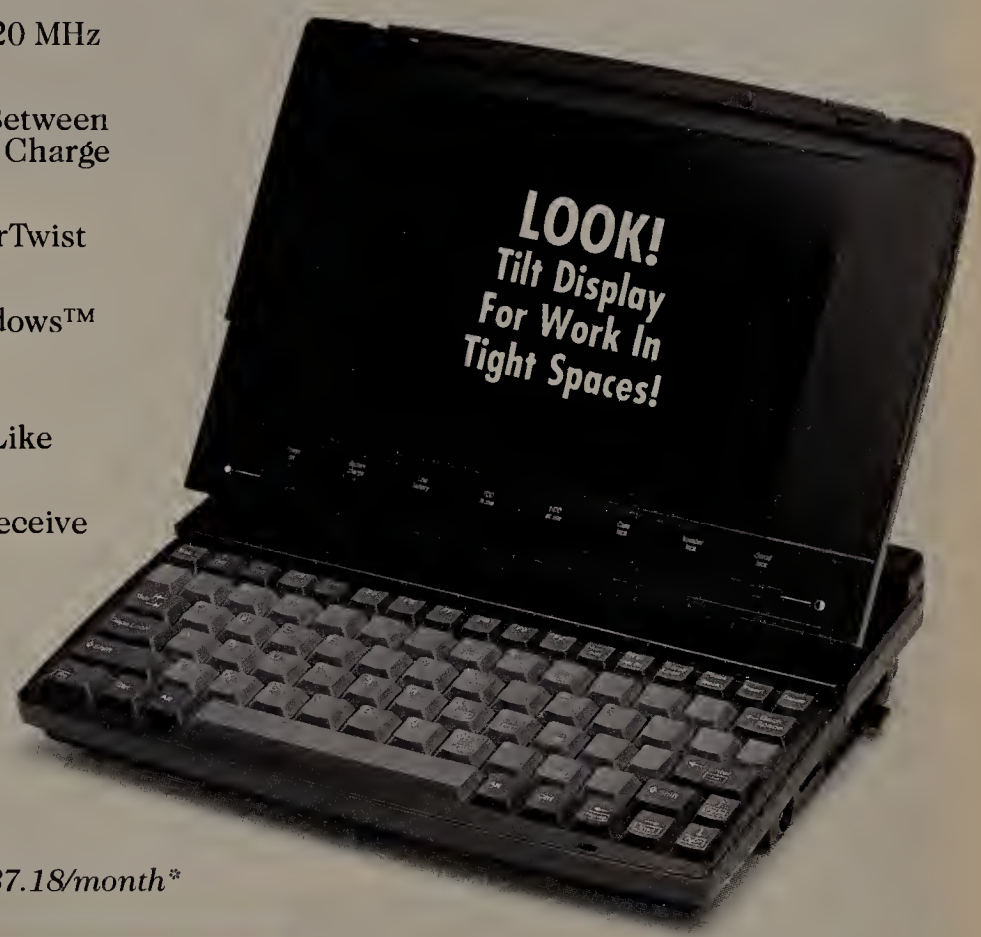

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— PC Magazine, May 26, 1992

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CODE N4207

Personal Data Managers

These low-cost, surprisingly powerful packages put the right information at your fingertips—without forcing you to do any programming.

BY PAUL LITWIN

For many people, the words *data base* have roughly the same appeal as *tax audit*. If that's the way you feel, it's too bad, because a data base manager could be just the tool you need. Every day brings more information—names and addresses, phone numbers, appointments, items for to-do lists, mailing lists, inventory, and customer records. What you need is a way to manage it all that doesn't require a degree in programming or huge investments of time and money. What you need is a *personal* data base manager.

Powerful and flexible enough to organize a wide variety of information, personal data managers let you set up data bases, run queries, and generate reports using a handful of commands—and you don't have to learn a complicated programming language or shell out big bucks for heavy-duty software.

Personal data managers have picked up some of the *relational skills* that once belonged to high-end packages. They now let you link, or relate, separate files in queries, reports, and data input. This makes them easier to use than the flat-file alternatives—if you have several contacts at a company, you won't have to reenter the same address for all of them—and more powerful.

If you decide to brave the personal data base arena, you'll have plenty of programs to choose from. There are new versions of old DOS standbys such as *PC-File, Professional File,* and *Q&A*. If you're a *Windows* user, you have your choice of two personal programs: *AceFile* and *Superbase 2*.

The most interesting entries in this sector of the data manager field, however, are new downgraded "personal" versions of high-end packages. *Clarion Personal Developer, DataEase Personal,* and *Personal R:BASE* differ from their more fully powered siblings in three ways. First and foremost, the downgrades are dirt cheap—*Personal R:BASE* lists for $99, compared with *R:BASE 3.1*'s $795 price tag. Second, the personal programs don't have the programming languages the high-end versions use to automate and customize data entry, querying, and reporting. Finally, none of these downgrades can manage data over a network.

If you need a shared, mission-critical application, a personal data manager is not the best choice. You want a full-powered package such as *dBASE, Paradox, R:BASE,* or *FoxPro,* and you'll probably want to hire a crack programmer to write a customized application for you. But if your needs are more modest, a simpler, more personal program may be all you need.

Making the Personal Choice

For this review, we collected eight personal data managers. We limited the field to programs with list prices under $400—half the price of *dBASE IV, FoxPro,* and *Paradox*. One package we'd hoped to include, Approach Software's new *Windows*-based data manager *Approach,* was not available at press time (see

ILLUSTRATION BY HIRO KIMURA

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this month's *New Products*).

Even in this small field, you'll find a wide array of skills and specialties. *Q&A*, for example, combines a powerful data manager with a built-in, fully capable word processor, making it the logical choice for merged mailings. *AceFile* has less power, but its slick *Windows* interface makes it easy to learn; the other *Windows* program, *Superbase 2*, is better suited to more advanced users. *Clarion Personal Developer* isn't really a data base manager at all; it's an *application generator* that lets you create automated data base applications. Others—*DataEase Personal, PC-File, Personal R:BASE,* and *Professional File*—are straightforward meat-and-potatoes data managers, robust enough to handle big mailing lists and data imported from your company's network file server.

When the final query had been run, Microrim's Personal R:BASE emerged the winner.

When it came time to grade these data managers, we gave greatest weight to ease of use. We also looked at the range of data input controls, the options for looking at the input data (forms and views), the programs' capabilities for selecting and summarizing records (queries and reports), and the speed with which they work.

When the final query had been run, Microrim's *Personal R:BASE* emerged the winner. It's the one program that seems to do it all—it's easy to use *and* extremely powerful. Throw in full upgradability to *R:BASE 3.1* and a remarkable $99 price, and you have a personal data manager that earns Best Buy honors for the second year in a row.

Paul Litwin is a medical statistician and a contributing editor for Data Based Advisor *magazine.*

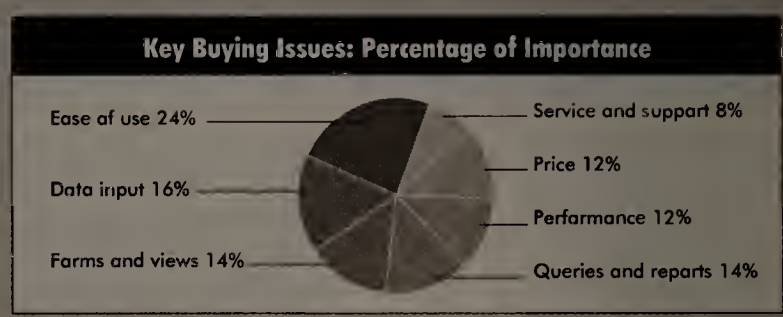
For more information about all products in this article, circle reader service no. 905.

EXECUTIVE SUMMARY

Personal R:BASE's Repeat Performance

From an easy interface to attractive forms and reports, Personal R:BASE does everything to make personal data management a breeze.

While some packages specialized—**AceFile** in ease of use and data input, **Q&A** in data input and reporting, and several programs in snappy performance—**Personal R:BASE** came through for the second year in a row by performing consistently well in every category, at a remarkably low price. If it hadn't been hobbled by a high price, **Q&A** would have also earned our highest recommendation.



Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Ease of use	Data input	Forms and views	Queries and reports	Performance	Price	Service and support	Overall value
AceFile 1.01	730	☆☆☆☆	☆☆☆☆	☆☆☆	☆☆☆	☆	☆☆	☆☆☆	★★★
Clarion Personal Developer, Report Writer	731	☆☆	☆☆☆	☆☆☆	☆☆½	☆☆½	☆☆☆½	☆☆	★★½
DataEase Personal 1.0	732	☆☆	☆☆☆	☆☆½	☆☆☆½	☆☆½	☆☆☆☆	☆☆½	★★★
PC-File 6.5	733	☆☆☆	☆☆☆½	☆☆☆½	☆☆½	☆☆☆	☆☆☆½	☆☆½	★★★
Personal R:BASE 1.0	734	★★★★	★★★½	★★★★	★★★★	★★★★	★★★★	★★	★★★★
Professional File 2.02	735	☆☆☆½	☆☆☆	☆☆½	☆☆½	☆☆☆☆	☆☆	☆☆☆	★★★
Q&A 4.0	736	☆☆☆	☆☆☆☆	☆☆☆½	☆☆☆☆	☆☆☆☆	☆	☆☆☆½	★★★½
Superbase 2 1.3	737	☆☆	☆☆☆☆	☆☆½	☆☆☆½	☆☆☆½	☆½	☆☆½	★★★

Overall value is calculated by multiplying each category rating by the category's weight percentage, summing the results, and rounding to the nearest half number.

AceFile 1.01

PROS: Easy to get up and running quickly, excellent data input skills
CONS: Odd querying mode, no wild-card searches, slow

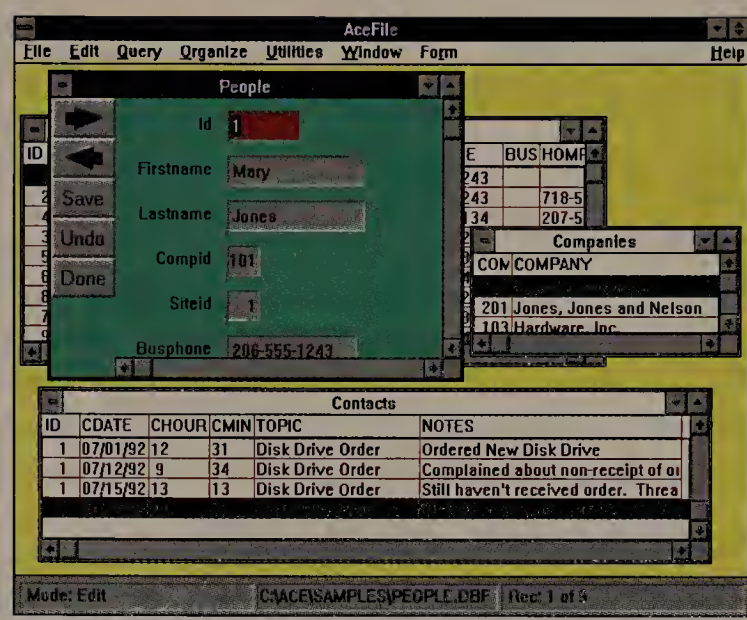
WINDOWS Taking full advantage of the *Windows* interface, *AceFile* is a good program for data management neophytes. Unfortunately, if you venture beyond the basics, you may find the program lacking.

Novices should be able to start their first *AceFile* data base without even reading the manual: Click on *File*, select *Create Database*, and you'll be in a simple dialog box, ready to define fields. Once your data base is defined, *AceFile* has several helpful tools for data input, such as unique fields, global search and replace, and the capability to import data from a variety of other applications.

AceFile 1.01's limitations become more apparent once you've entered the data. Its querying skills, for example, are a mixed bag. On the one hand, linking files is surprisingly easy, thanks to the Query Relate dialog box. But querying itself involves a nonintuitive dialog box—the program has no query by form or query by example. Need to search for all customers with last names beginning with *S*? Sorry, *AceFile* can't do wild-card searches.

It's the same story with reports. Some jobs are easy: The quick-report utility produces fast, no-frills printouts, and *AceFile* also has a competent band-oriented report writer, support for cross-tabs, and a text editor for mail merges. But if you want to produce a report from linked files, *AceFile* is the only program here that can't do it.

According to the vendor, many of these drawbacks should be addressed in a revision due this summer. Despite its limitations, if the price were a bit lower and performance a bit faster, *AceFile* would have ranked with the best programs here. Still, if you need an easy-to-use *Windows* program to keep track of names and addresses or as a front end to your company's *d:BASE* files, *AceFile* may be the ticket.



AceFile has all the ease of use of the Windows interface, but may not be powerful enough for some users.

Clarion Personal Developer 2.0, Clarion Report Writer 2.0

PROS: Inexpensive, powerful data input
CONS: No ad-hoc querying, obtuse interface, poor documentation

Clarion Personal Developer is not a real data base manager, but an *application generator*, which makes it best suited for automating repetitive data management tasks.

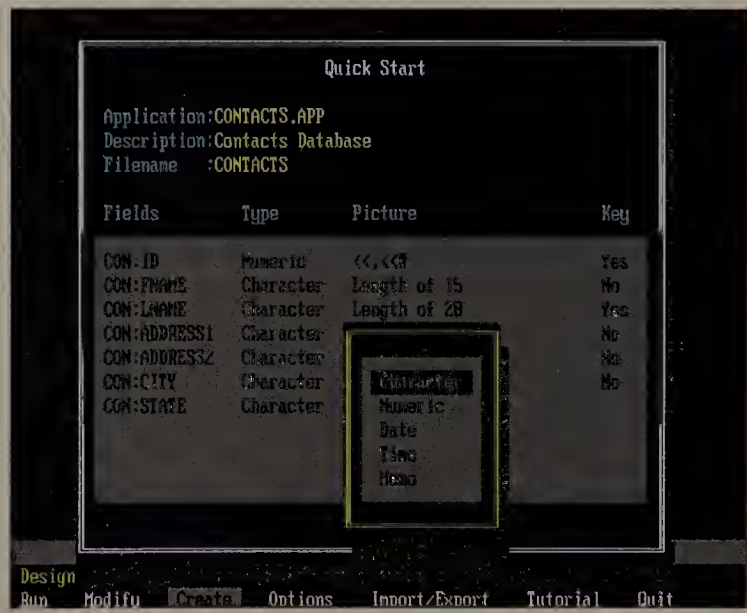
With an application generator, you define everything ahead of time—forms, views, queries, and reports, as well as the data base itself. Once you've done that, a *Clarion PD* application does many things plain data managers do.

As application generators go, *Clarion PD* is relatively friendly. To set up a new data base, you select *Create-Quick Start*, answer a few questions about your data, and sit back. In about a minute, out pops a compiled application with default form and table views and some rudimentary reporting capabilities—similar to what you'd get from other programs' default views and quick-report output.

Clarion PD 2.0 is handy enough with data input. The program supports lookup tables, data input checks, and unique and variable-length memo fields. It can't, however, perform global searches and deletes or search for duplicate records.

Unfortunately, because it's an application generator, *Clarion PD* can't do queries unless you define them ahead of time. Also, its report writing is limited. For that reason, you'll probably want to pair *Clarion PD* with its companion, *Clarion Report Writer* (also $79 list), a band-oriented report writer that easily handles multifile reports.

Even when combined with *Clarion RW*, however, *Clarion PD* won't be right for users who require a more spontaneous product. But if you're willing to invest a little brain power designing mailing list and other static, repetitive applications, *Clarion PD* could be the program for you.



Clarion Personal Developer is ideal for repetitive data management applications.

DataEase Personal 1.0

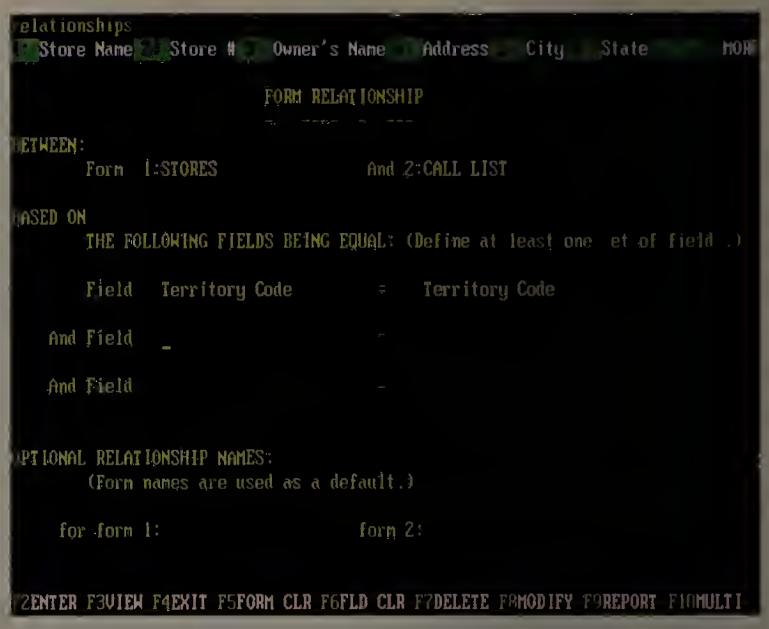
PROS: Inexpensive, easy data linking, handy data input and form views
CONS: Awkward file handling, no band-oriented report writer, no table view

DataEase Personal is a $99 downgrade of *DataEase 4.5*, from which it has inherited some powerful querying capabilities along with a few eccentricities.

DataEase's data input skills are good but inconsistent. On the one hand, it gives you a full complement of data input controls, including auto-incrementing fields, data input checks, and customized help messages. On the other, it can't perform global changes or directly read or write DBF files.

Also, file handling with *DataEase Personal* is somewhat confusing, because the program does not support putting data files into different subdirectories: When you call up a file, it has to be in the same subdirectory as the program files. The program also lacks such familiar amenities as mouse support and pulldown menus, and it uses unorthodox function keys.

Forms and views are similarly hot and cold. *DataEase*'s "relationships form" will walk you through the task of creating multifile links. Once you've created the data base and the relational links between your data, all forms, queries, and reports attached to the tables automatically inherit those links. On the downside, the biggest problem is the absence of what other programs call a table view.



DataEase Personal has decent relational skills and is strong on querying and reporting, but it has its quirks.

For simple queries and reports, you can use either query by form or the quick-report option. If you need more complex reports, you'll have to resort to the DataEase Query Language, because the program has no band-oriented report writer.

DataEase Personal is a sound, inexpensive program with powerful relational and querying skills. This power, however, comes at the cost of reduced ease of use. Unless you plan to share data with *DataEase 4.5* users, you'd be better served by *Personal R:BASE*.

PC-File 6.5

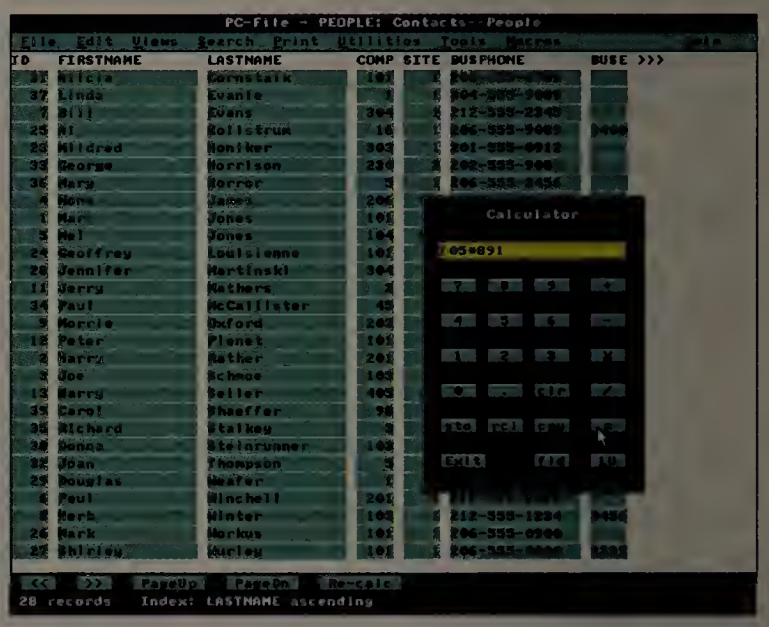
PROS: Flexible table and forms views, good price **CONS:** Limited data input and relational skills

Flexibility is *PC-File*'s forte. This $149.95 program gives you plenty of ways to define data bases, view data, and write reports. Unfortunately, it doesn't give you as much choice when it comes to such tasks as checking your data or linking files.

From the outset, *PC-File* gives you the choice of a character-based interface or a slower graphical mode, both of which are attractive and mousable. Similarly, when creating a data base, you can choose the Fast definition mode, in which *PC-File* generates a basic default form, or the Paint mode, in which you lay out the form and the program defines the fields.

PC-File has trouble checking data input. The program will keep careless users from entering numbers in a mailing list's state field, for example, but it doesn't have true data input rules, which could prevent the entry of such unacceptable state abbreviations as GO or FO. *PC-File* supports global updates and searches for duplicate records, however, so you can clean up your data *after* it's been entered.

Queries and reports are nothing special. For reporting, *PC-File*'s quick-report module produces basic columnar lists. For mail merging, you get a competent text editor. Using the band-oriented report writer, however, is frustrating. In fact, if you wanted something more complex than a quick report, you might prefer to write the report code yourself in *PC-File*'s arcane report language. The program's biggest limitation, however, is that it won't let you perform queries on more than one file at a time.

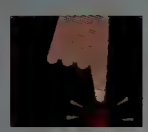


PC-File is a good, straightforward data manager, though its relational skills are limited.

Its flexible forms and table views and its text editing capabilities make *PC-File* a good choice for keeping track of your schedule and phone book. But for more demanding business applications that require reporting on multiple files and strong data input controls, you might want to look elsewhere.

Buying Smart: Curing Dataphobia

If the idea of managing a data base gives you the heebie-jeebies, you'll be glad to know that several of these personal data bases are genuinely easy to use. But to find a package that's useful and easy, you must consider each program's data input skills, the flexibility of its forms and views, and its querying and reporting capabilities, as well as its performance and technical support.



EASE OF USE

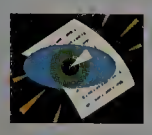
When evaluating ease of use, start with the obvious. Are the menus well organized, with data input, querying, and reporting functions clearly and logically arranged? How's the help? If you're desperate, several programs include prewritten applications, like address books. Of these programs, *AceFile* is the easiest for neophytes, and *Personal R:BASE* is best for advanced users.

DATA INPUT

Before you can use a data base, you have to define it. These programs all support text, number, date, logic, and calculated fields. Variable-length memo fields let you add notes to your records without limiting their size ahead of time.

Once you've designed your data base, you'll want to be sure the right data gets into it. Lookup tables let you define lists of possible entries for each field, while rules governing data input let you limit a field's entries. Unique fields prevent you from duplicating key information. If you want to use data from another application, most of these programs import ASCII, DBF, and *1-2-3* files. Many can read and write DBF files directly, without the intervening import or export step. *Q&A* even lets you read from SQL data bases directly.

AceFile, *Q&A*, and *Superbase 2* have the best data input skills of the programs in this review.



FORMS AND VIEWS

Once you've input the data, you're going to want to look at it, which is what form and table views are for.

The *form view* is where you input and edit data; it looks something like a paper form. A *forms painter* customizes the form view by rearranging fields and adding lines and boxes. All the programs here let you look up information in other files when entering data; only *Personal R:BASE* and *Superbase 2* let you display fields from more than one file on a single form.

A *table view* looks like a spreadsheet and lets you see many records at once. Some programs let you customize the table view by changing the order and width of columns; good ones let you edit data in the table.

Personal R:BASE earns top marks for its forms and views options.

QUERIES AND REPORTS

While forms and views let you look at raw data, queries and reports let you extract specific information for analysis.

Querying is a way of searching for and displaying groups of records. *Query by form* (QBF) is the simplest: A form pops up, and you type in the values you want to search for in the appropriate fields. Unfortunately, QBF won't let you add fields not already in the data base (such as calculations) or query data files that aren't already linked. For these more complicated queries, you need *query by example* (QBE). QBE uses a table instead of a form and lets you link files and add fields.

While queries select records, *reports* summarize information, usually in printed form. All the programs here have *quick-report writers*, which create basic, spreadsheetlike reports. With *band-oriented report writers* you can design more complex reports by dividing the screen into horizontal *bands* for the likes of column headings, details, and subtotals. Some programs have query and/or report languages that let you further customize your output. *Cross-tab reports* let you summarize several fields at a time in a matrix.

When it comes to querying and reporting skills, *Personal R:BASE* and *Q&A* are the clear winners.

PERFORMANCE

If you're sorting thousands of sales records by three criteria and totaling several fields, you'll appreciate a program's speed. *Personal R:BASE*, *Professional File*, and *Q&A* ran fastest overall in our performance tests.

SERVICE AND SUPPORT

No matter how easy a program is to use, the time will probably come when you'll want to call for help. Unfortunately, many vendors are using 900 numbers these days, which can cost you $2 or $3 a minute.

In evaluating service and support, we tested the responsiveness and accuracy of each vendor's answers to three typical questions and factored in the company's service policies. While none of these packages are backed by what we would call stellar technical support, Symantec's support for *Q&A* was better than that provided by the other vendors.

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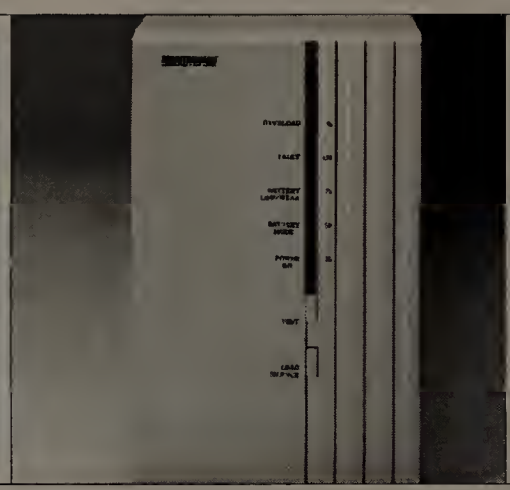

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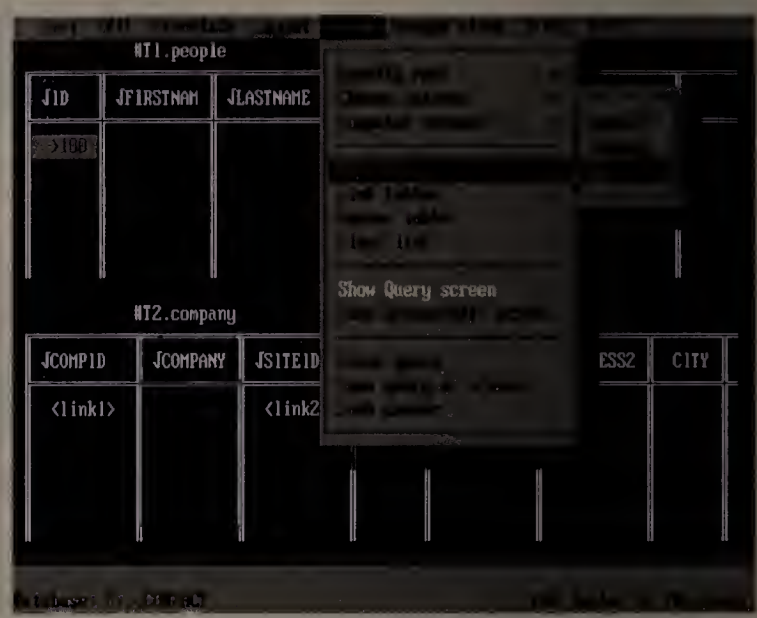
Personal R:BASE 1.0

PROS: Strang query-by-example and report writer madules, fast, inexpensive
CONS: Na single-keystrake switch between farm and table views

Personal R:BASE is the most capable all-purpose program here. Its relational skills rival those of full-blown programmable data base programs, its querying options give you unrivaled access to your data, and it has a great band-oriented report writer.

To get you off on the right foot, *Personal R:BASE* provides a rich assortment of data input aids, including unique, auto-incrementing, and calculated fields; global editing; and pop-up lookup tables. It can import data in a variety of file formats and read and write DBF files directly.

Querying and reporting is also a snap. *Personal R:BASE* is the only program here that lets you query by example. It performs relational queries almost seamlessly—just select *Add Table* from the Query menu, select the linked table, and specify the criteria that you want to apply. Need a report on the results of your query? Save the query, start the reports module, and you're ready to format and print the query result using the band-oriented report writer. And *Personal R:BASE* does all this faster than any other package here.



Personal R:BASE gives you ease of use plus such features as full relational skills and querying by example.

The program does have two faults: It doesn't allow you to check for duplicate records once they've been entered, and it won't let you switch between table view and form view with a single keystroke, unlike most of the programs we reviewed.

Those two quibbles aside, at $99, *Personal R:BASE* is almost a steal. Any data bases you develop will still work if you decide to upgrade to *R:BASE 3.1*—but you may never want to. *Personal R:BASE*'s power and simplicity make it the right choice for just about any personal data management job, and that makes it *PC World*'s Best Buy for the second year in a row.

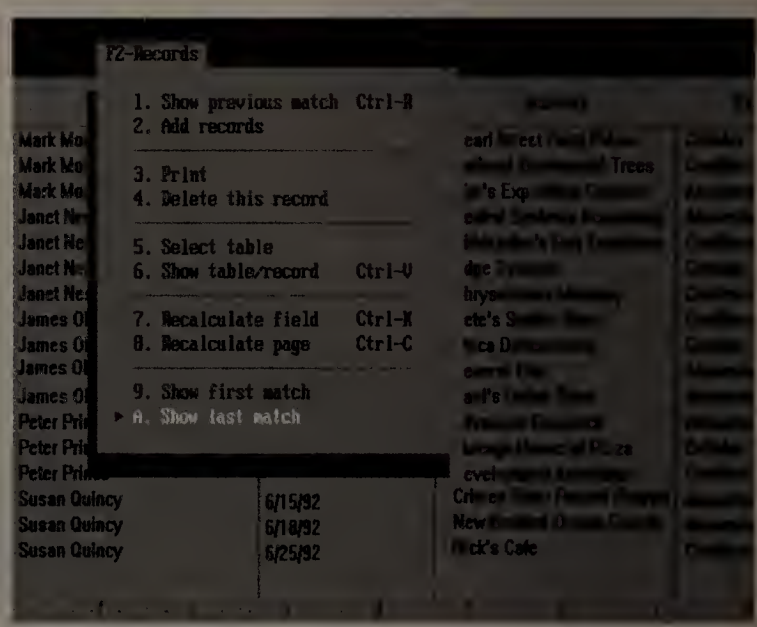
Professional File 2.02

PROS: Easy ta use, gaad data input checks, fast **CONS:** Bare-banes repart-ing and querying, limited relatianal capabilities

Professional File is a good, no-nonsense data manager that has trouble with some of the more complex data management jobs.

Controlling data input in *Professional File* is easy and intuitive. To make sure new entries in a date field are always prior to the current date, for example, you enter '<Today' in the form design menu; to define a calculated profit field, you enter '#Profit = #Sales – #Cost'. You can create lookup links to other files, and if you're using data from other applications, *Professional File* should be able to import it. Unfortunately, if you modify fields of an existing data base, you may be dismayed to find the order of all the records in the data base is reversed.

Defining basic queries and reports is easy once you become accustomed to *Professional File*'s unconventional interface (you pull down menus with function keys rather than using <Alt>-*key* combinations, and you won't find any mouse support). But *Professional File* isn't able to handle relatively complex queries such as 'State=ME or Age>65' that place Boolean operators between different fields. Also, you can't perform a query on related files. If you need any kind of complex report, *Professional File*'s form-based report writer may fall flat. While *Professional File* makes you enter such cryptic commands as 'Units Booked=2scsmaxstw7' to design reports, the band-oriented report writers in other programs are much easier and more powerful.



Professional File is fast and easy to use but falls short on querying and reporting.

Still, if you want a fast (second only to *Personal R:BASE* in our performance tests), easy-to-learn program with good data input controls, and you don't require much in the way of complex querying, reporting, or file linking—if, for example, you want to maintain a no-nonsense mailing list—*Professional File* could be the program for you.

The Complete Data Manager

Personal R:BASE combines most of the data-input and file-linking skills you need with solid reporting and querying—all for under $100 list.

● Yes
○ No

	AceFile 1.01	Clarion Personal Developer 2.0 and Clarion Report Writer 2.0	DataEase Personal 1.0	PC-File 6.5	Personal R:BASE 1.0	Professional File 2.02	Q&A 4.0	Superbase 2 1.3
Standard features								
List price	$295	$158[1]	$99	$149.95	$99	$299	$399	$345
Drop-down menus/mouse support	●/●	○/○	○/○	●/●	●/●	●/○	○/●	●/●
Context-sensitive help/hyperlinked help/tutorial	●/●/●	●/○/●	●/○/●	●/○/●	●/●/●	●/○/●	●/○/●	●/●/●
Bundled applications	5	9	2	1	5	0	6	0
Auto-dialer	●	○	○	●	●	○	○	○
Macro language	●	○	○	●	●	●	●	●
Upgradable	○	●	●	○	●	○	○	●
Data input								
Maximum records per file	2 billion	2 billion	65,535	2 billion	2 billion	59,000	16 million	1 billion
Maximum fields per record	128	65,536	255	128	80	3200	2045	999
Variable-length memo fields	●	●	●	●	●	●	●	●
Auto-incrementing/calculated fields	○/●	●/●	●/●	●/●	●/●	○/●	●/●	●/●
Lookup tables/data input rules	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
Unique fields/finds duplicate records	○/●	●/○	●/●	○/●	●/●	●/●	●/●	●/○
Global search and replace/global delete	●/●	○/○	○/○	●/●	●/●	●/●	●/●	●/●
Import, export ASCII/DBF/1-2-3	●/●/●	●/●/○	●/●[2]/●	●/●/○	●/●/●	●/●/●	●/●/●[2]	●/●/○
Read, write DBF/SQL	●/○	●[3]/○	○/○	●/○	●/●	●[3]/○	○/●	●[3]/○
Forms and views								
Forms painter	●	●	●	●	●	○	●	●
Editable/customizable table view	○/●	○/●	○/○	●/●	●/●	●/●	●/●	○/●
Multifile forms	●[3]	●[3]	●[3]	●[3]	●	●[3]	●[3]	●
Keystroke switch between table and form views	●	●	○	●	●	●	●	○
Queries and reports								
Query by example/query by form/English-language queries	○/○/○	○/○/○	○/●/○	○/●/○	●/●/●	○/●/○	○/●/●	○/○/○
Complex criteria[4]/calculated fields/wild-card searches	●/○/○	○/○/○	●/●/●	●/●/●	●/●/●	○/●/●	●/●/●	●/●/●
Saves queries for reuse	●	●	●	●	●	●	●	●
Quick-report writer/band-oriented report writer	●/●	●/●	●/○	●/●	●/●	●/○	●/○	●/○
Calculated fields	●	●	●	●	●	●	●	●
Cross-tabs	●	○	●	○	●	●	●	○
Multifile queries/reports	●/○	●[3]/●	●/●	○/●[3]	●/●	○/●[3]	●[3]/●[3]	●/●
Graphics charts	●	○	○	●	●	○	○	○
Text editor/label support	●/●	○/●	○/●	●/●	●/●	○/●	●/●	●/●
Service and support								
Free support/toll-free technical support	●/●	●/○	●[5]/○	●/○	●[6]/●	●[5]/○	●/○	●/○
BBS/fax	●/●	●/●	○/○	●/●	●/●	○/●	○/●	●/●
					BEST BUY			

[1] Sum of list prices for two separate packages.
[2] Import only.
[3] Lookups only.
[4] For example, Field1=X OR Field2=Y.
[5] First month only.
[6] First three months only.

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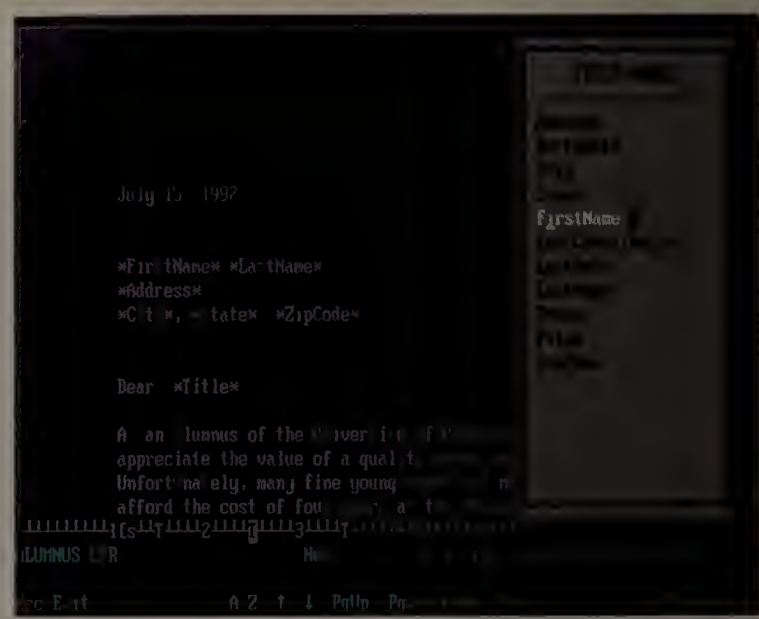
Q&A 4.0

★★½ **PROS:** English-language queries, excellent data input skills, built-in word processor, fast **CONS:** Expensive

Combining excellent data input and querying skills with a highly capable word processor, *Q&A* has long been regarded as the ideal program for mass mailings. The newest version has added programming tools, direct access to corporate data bases, and improved querying to become one of the most powerful all-around personal data managers you can find today.

Getting data into *Q&A* is extremely simple, thanks to a full complement of data checking tools and auto-incrementing and calculated fields. It can import most file formats, and it's the only program here that reads SQL data bases.

After you've entered your data, *Q&A* allows you to query it by means of a natural-language query module that understands a reasonable subset of English. For example, you can retrieve data by typing in requests such as 'List average salary and average bonus by employment category'. You'll find an on-line Query Guide available to help you with query syntax. You can also perform more traditional queries by form. While support for complex queries is not perfect—you can specify 'Sex=F or Age>65', but you can't use 'Sex=F or (Age>65 and Retired=Y)'—it's probably adequate for most of your querying needs. *Q&A* uses a form-based report writer, and it can handle cross-tabs.



Q&A may be the best package here for mass mailings, but that's not all it can do.

Q&A does have its shortcomings. It doesn't have a band-oriented report writer, it can't directly read from or write to DBF files, and its multifile skills aren't as powerful as some other data managers'. Also, at $399, *Q&A* is the most expensive program in the roundup.

Still, if you can afford it, *Q&A* is one of the best packages here, and if you do mass mailings, it's probably *the* best. Had the price not been the highest of the group, *Q&A* would have joined *Personal R:BASE* as a Best Buy.

Four Problems in Search of a Personal Data Manager

Everyone needs to track names, addresses, phone calls, and appointments. But some of us also need to manage mailing lists or record transactions with customers. And what happens if your company maintains enterprisewide data bases to which you need access?

You could buy separate programs to manage each type of information. But if you take the time to assess your data management needs, you may find one personal data manager to handle them all. In addition to saving money, using one package will let you spend less time on the learning curve and more time with your data.

To help you make your way through this appraisal process, we've assembled four common data management scenarios. Along with each scenario, we've listed the important buying issues and the programs that best fit the bill. The upshot: Microrim's *Personal R:BASE* can handle almost anything.

ILLUSTRATION BY HIRO KIMURA

1. Personal Information Management

You need to keep track of your calendar and contacts. To avoid scheduling conflicts, you'll need support for unique fields. You'll want to attach memos to personal and appointment records. Since your data will be spread across multiple files, you'll want a program with some relational capabilities. You'll want to set up some standard queries—such as appointments sorted by time or contacts sorted by name—so you'll need a program that can handle queries involving complex criteria. Likewise, you'll want to produce custom reports—such as a monthly calendar—so the program should have a band-oriented report writer.

Key features: Unique fields, variable-length memo fields, multifile queries and reports, complex criteria, band-oriented report writer

Superbase 2 1.3

PROS: Better-than-average performance, excellent data input **CONS:** Difficult, nonstandard Windows interface

WINDOWS *Superbase 2* is one of two *Windows* programs here, but unlike *AceFile*, *Superbase 2* makes little effort to be friendly.

Rather than take advantage of the *Windows* interface the way *AceFile* does, *Superbase 2* dispenses with such *Windows* standards as scroll bars and overlapping windows and uses instead a VCR-like control panel—which, as VCR users already know, does not mean that it's easy to use.

If you can get past the clunkiness, however, you'll be rewarded with some real data management power. Data input is excellent. The program supports extensive tools for checking data input checking and customizable error messages (handy if someone else is entering your data), and it can handle a huge number of records and fields.

Superbase 2 gives you several ways of looking at your data once it's been entered. Though its table view is mediocre, the program gives you three form views, including a form painter, which features drawing tools, color and font support, and multifile capabilities. Except for *Personal R:BASE*, *Superbase 2* is the only program here that can fully link files in forms, queries, and reports.

Though the VCR-like interface is difficult, Superbase 2 is a powerful Windows data manager.

Superbase 2 uses a nonstandard but powerful query technique that requires a solid understanding of Boolean logic. If you take the time to learn it, though, you'll be rewarded with a powerful query facility. The program can also produce reports based on multiple files, but it lacks a band-oriented report writer, and it can't perform cross-tabs.

It's a shame *Superbase*'s interface is so gawky, because underneath the clumsy exterior sits a solid data base manager. Though it could use an interface-lift and a band-oriented report writer, *Superbase 2* is, for the time being, the only option for the *Windows* user who wants data management power at a personal price.

Recommendation: *Personal R:BASE* does best; *AceFile* is a good alternative for beginners.

2. Mailing Lists

You keep extensive lists of customers or clients. In addition to storing names and addresses, you want to do mass mailings and then track responses or membership activity. Data input controls will keep different types of information—dates, ZIP codes, text—in order. An assistant will do the typing, so customizable applications and a forms painter will be helpful. For mailings, you'll need to export addresses in ASCII format or write a letter with a built-in text editor. You'll also want to generate mailing labels. For reports, you have to be able to link separate files—one for addresses and another for orders.

Key features: Data input checks, customized applications, forms painter, text export, label formatting, multifile reports

Recommendation: *Q&A* is the unchallenged master of the mailing list.

3. Business Reporting

You want to do ad hoc queries and generate reports on your company's DBF or SQL files. You'd like to read this data without having to import it.The information is in several files that you need to link in queries and reports; because these files are huge, you'll need speed.

Key features: Capability to read DBF or SQL files directly, multifile querying and reports, fast performance

Recommendation: *Personal R:BASE* or *Superbase 2* for *d:BASE* data, *Q&A* for SQL files.

4. Flat-File Data Management

You need to keep track of inventory for your department, office, or small business. Since you'll be entering a large quantity of data, input forms should be easy to set up. You'll also want calculated and auto-incrementing fields and the capability to control data entries.

Key features: Easy-to-set-up forms, auto-incrementing fields, calculated fields, data input checks

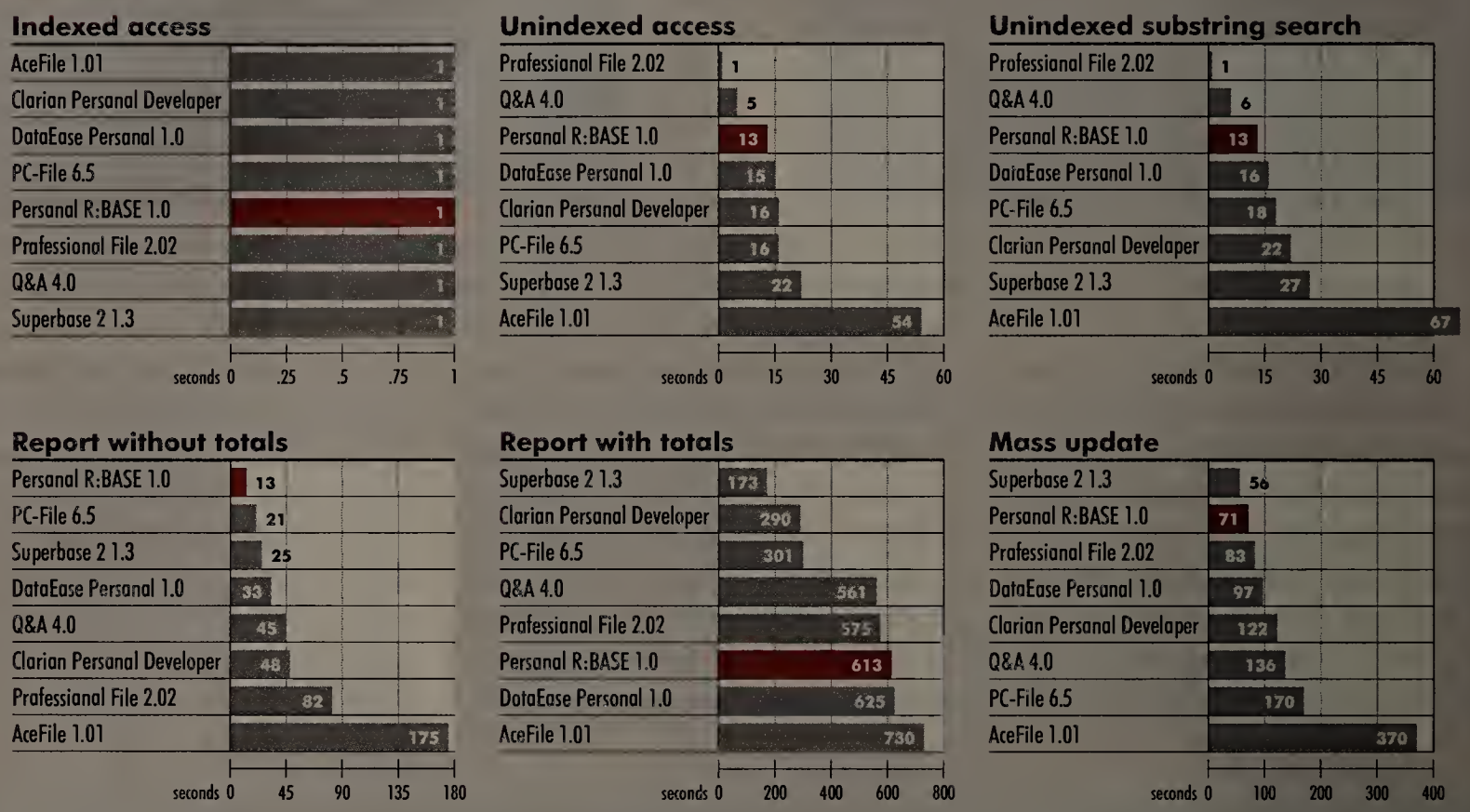
Recommendation: Almost any package here—especially *AceFile*, *Personal R:BASE*, *Q&A*, or *Superbase 2*.

PC WORLD TEST REPORT

Personal R:BASE, Professional File, Q&A Run Neck and Neck

Personal R:BASE didn't win every time, but its consistent midrange performance edged it into the lead, followed closely by Professional File and Q&A.

BEST BUY



Methodology
We perform all tests on a 20-MHz Zenith Data Systems 486SX/20E with 4MB RAM and a 200MB IDE hard drive. We set up a 19-field data base of video inventory with the first field indexed. The data base contains 10,000 records. All reports are printed to a file.

Indexed access
We search the indexed video ID field for a specific video number.

Unindexed access
We search the unindexed title field for a specific title.

Unindexed substring search
We search the title field for a portion of a title.

Report without totals
We generate a report listing the contents of seven fields from the record of every science fiction video in stock. The content of the category field is used as the reporting criterion but is not included in the report.

Report with totals
We generate a report listing the contents of seven fields of all the records in the data base by category, with subtotals and a final total calculated on the price field.

Mass update
We search the entire data base for records containing a specific rating and update the records found with a changed rating.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

WHERE TO BUY

AceFile 1.01
Ace Software Corp.
1740 Technology Dr.
#680
San Jose, CA 95110
408/451-0100,
408/437-1018 (fax)
LIST PRICE: $295
Reader service no. 730

Clarion Personal Developer 2.0, Clarion Report Writer 2.0
Clarion Software Corp.
150 E. Sample Rd.
Pompano Beach, FL
33064
800/354-5444,
305/785-4555
LIST PRICE: $79 each
Reader service no. 731

DataEase Personal 1.0
DataEase Int'l Inc.
7 Cambridge Dr.
Trumbull, CT 06611
800/243-5123,
203/365-2317 (fax)
LIST PRICE: $99
Reader service no. 732

PC-File 6.5
ButtonWare, Inc.
P.O. Box 96058
Bellevue, WA 98009
800/528-8866,
206/454-0479 (fax)
LIST PRICE: $149.95
Reader service no. 733

Personal R:BASE 1.0
Microrim Inc.
15395 S.E. 30th Pl.
Bellevue, WA 98007
800/628-6990,
206/649-9500
LIST PRICE: $99
Reader service no. 734

Professional File 2.02
Software Publishing Corp.
3165 Kifer Rd.
P.O. Box 54983
Santa Clara, CA 95056-0983
800/237-9391,
408/986-8000
LIST PRICE: $299
Reader service no. 735

Q&A 4.0
Symantec Corp.
10201 Torre Ave.
Cupertino, CA 95014-2312
800/441-7234,
408/252-3570
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Superbase 2 1.3
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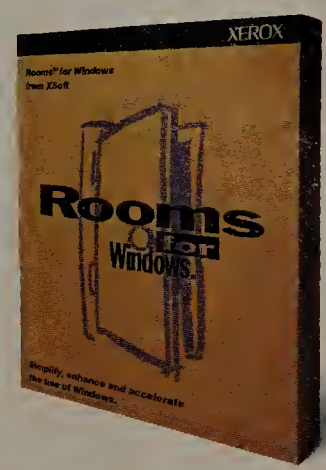

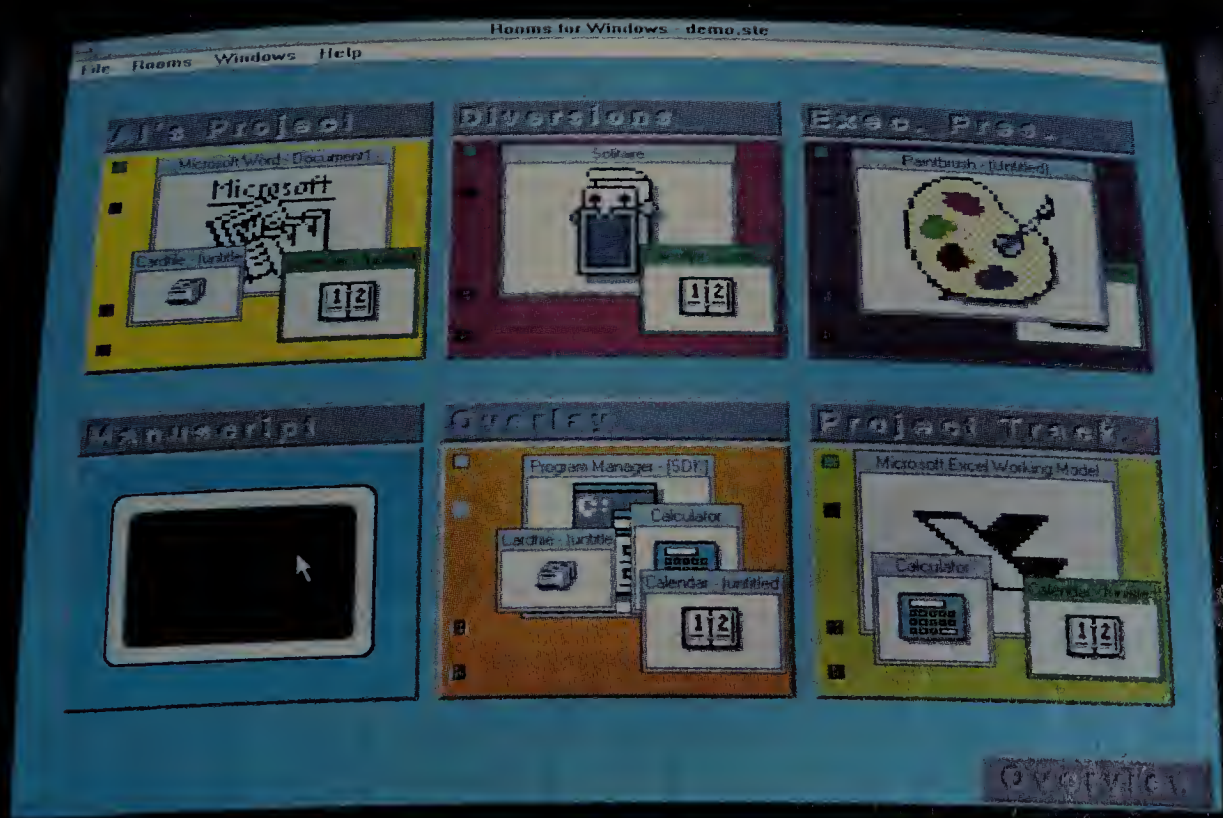

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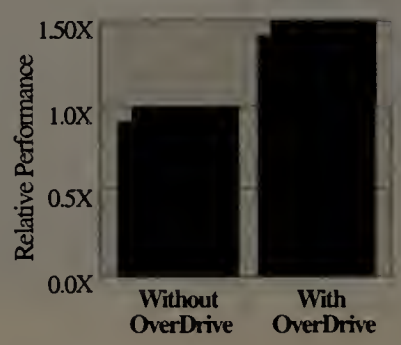

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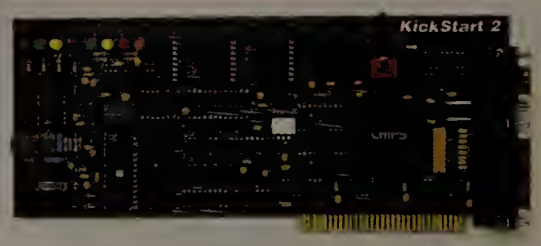

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PC MAGAZINE
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August 1990
Service Diagnostics: The Kit

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Bill O'Brien, PC Magazine

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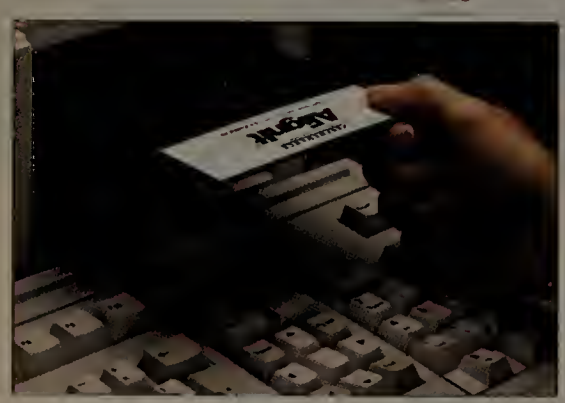

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Q. *I am fluent with DOS and many applications but would like to learn more. Can you recommend one or more books that explain wait states, interrupts, stacks, and the like?*

MARK D. WALTER
CARROLLTON, TEXAS

A. Here are a few of our favorites. Microsoft itself publishes several excellent DOS references, from Van Wolverton's user-friendly *Running MS-DOS* to the exhaustive *MS-DOS Encyclopedia.* Addison-Wesley's *Undocumented DOS With Disk* fills the gaps in Microsoft's library, and Bantam's *DOS 5.0 Power Tools* consolidates a lot of elusive information. For hardware, check out *The PC Configuration Handbook,* Peter Norton's two books, and, highly recommended by *Star-Dot-Star* editor Brett Glass, *The XT-AT Handbook.*

Two of the best won't be found in a bookstore, but any IBM dealer should be able to order for you the definitive *IBM Technical Reference Manual for PC-AT* and *IBM DOS Technical Reference.*

WHERE TO BUY

DOS 5.0 Power Tools
Paul Somerson
Bantam Computer Books
ISBN 0-553-35464-7
LIST PRICE: $49.95, includes disks

Inside the IBM PC and PS/2
Peter Norton
Brady Computer Books
ISBN 0-13-465634-2
LIST PRICE: $24.95

Microsoft MS-DOS Programmer's Reference
Microsoft Press
ISBN 1-55615-329-5
LIST PRICE: $24.95

MS-DOS Encyclopedia
Microsoft Press
ISBN 1-55615-174-8
LIST PRICE: $69.95

The New Peter Norton Programmer's Guide to the IBM PC & PS/2
Peter Norton and Richard Wilton
Microsoft Press
ISBN 1-55615-131-4
LIST PRICE: $22.95

The PC Configuration Handbook
John Woram
Bantam Computer Books
ISBN 0-553-34947-3
LIST PRICE: $28.95

Running MS-DOS, Fifth Edition
Van Wolverton
Microsoft Press
ISBN 1-55615-337-6
LIST PRICE: $24.95

Undocumented DOS With Disk
Andrew Schulman et al.
Addison-Wesley
ISBN 0-201-57064-5
LIST PRICE: $39.95, includes disk

The XT-AT Handbook
John P. Choisser and John O. Foster
Annabooks
ISBN 0-929-392-00-0
LIST PRICE: $9.95

Q. *I've created several batch files for common tasks, but they leave a double prompt on the screen, like this:*

C:\MENU>
C:\MENU>

This is not a major problem, but it irritates me. How can I fix it?

ROBERT LAJEUNESSE
REPENTIGNY, QUEBEC, CANADA

A. The simplest fix is to start your batch file with the command @ECHO OFF on a line by itself. That stratagem will also eliminate the display of most commands executed by the batch file. If you prefer to see what the batch file is up to, make @ECHO OFF the last line.

Q. *I've done a lot of research trying to find a product that will let my PC take dictation but haven't found anything. Do you know of a product that will turn speech into text?*

V. J. LAMOUREUX
BENNINGTON, VERMONT

A. There are many hardware/software packages that let you control your PC through speech. The less expensive ones, such as Covox's $150 Voice Master Key, are simple units that you train to execute a limited number of macros by voice command.

For dictation, you need a more sophisticated speech recognition system. CCSI's $695 Intro Voice V is a small box that plugs into your serial port (making the product suitable for a laptop) and can recognize up to 1000 words. You can expand its vocabulary by defining various 1000-word sets and loading them as needed. If that's not enough, consider DragonDictate; the $9000 unit recognizes 30,000 words, 5000 of which are user definable. With practice, the company says, you can dictate as fast as 40 words a minute, but like all these products, DragonDictate requires you to pause after each word.

WHERE TO BUY

DragonDictate
Dragon Systems, Inc.
320 Nevada St.
Newton, MA 02160
800/825-5897, 617/527-0372 (fax)
LIST PRICE: $9000
Reader service no. 752

ANTHONY RUSSO

Intro Voice V
CCSI/The Voice Connexion
8258 Kingslee Rd.
Bloomington, MN 55438
612/944-1334
LIST PRICE: $695
Reader service no. 753

Voice Master Key
Covox, Inc.
675 E. Conger St.
Eugene, OR 97402
503/342-1271, 503/342-1283
LIST PRICE: $150
Reader service no. 754

Q. *In your November 1991 column, you said Microsoft's* Word for the Macintosh *could read* Word for DOS *files. My copy of* Word for Windows 2.0 *reads my clients'* Word for the Mac *files just fine. However, when they open a* WinWord *document I've saved in* Word for the Mac 4.0 *format, the file is scrambled. Is there some trick we're missing?*

MIMI HEFT
SAN FRANCISCO

A. The original release of *Word for the Macintosh 4.0* always interprets a file copied over from a DOS floppy as unformatted text, even when the file is in *Word for the Macintosh* format or a compatible format such as *Word for DOS.* Have your Mac-using clients call Microsoft at 206/635-7200 to get a free upgrade to *Word for the Macintosh 4.0d* or a later 4.0 version. Another alternative is for them to purchase the $129 upgrade to *Word for the Macintosh 5.0.*

Q. *I use a lot of programs that let me shell out to DOS. When I'm through, I enter EXIT to return to the program. How can I program an <Alt>-*function key *combination that will issue that command followed by a carriage return? I specifically want to use <Alt>-<F12> because it doesn't conflict with* WordPerfect's *function key assignments.*

JAMES HOFFER
ST. JOSEPH, MICHIGAN

A. You can redefine your keyboard using ANSI Set Keyboard Strings Escape sequences. In batch files (including AUTOEXEC.BAT), you start an ANSI command with ECHO, a space, the Escape character (ASCII 27), and a left square bracket ([). (At the command line or in batch files while ECHO is on, use PROMPT PG$E[instead; the $E is replaced by the Escape character when PROMPT executes.)

Getting the Escape character into your batch file can be tricky. If you're using the MS-DOS Editor (EDIT.COM), you can press <Ctrl>-P and then the <Esc> key. In many other text editors and word processors, you can hold down <Alt> and type 027 on the numeric keypad (some do not produce the Escape character but respond instead as though you had pressed <Esc>).

Don't forget the left square bracket. Continue the key redefinition command with the ASCII code of the key or key

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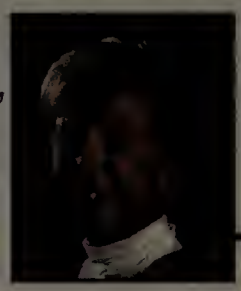

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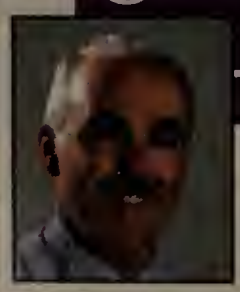

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Adam and Eve, 1526. Oil on panel, by Lucas Cranach the Elder. Courtald Institute Galleries

combination you want to redefine—0;140 for <Alt>-<F12>—and a semicolon. (Chapter 15 of the DOS 5.0 manual includes a chart of all the ASCII key codes you can use in ANSI commands.) Next type the command (or any string of characters) you want to assign to the key, enclosed in double quotation marks. Follow that with a semicolon and the code for <Enter> (13), if you want it in the definition. Finish with a lowercase *p* to mark it as an ANSI Set Keyboard Strings key redefinition. It should read ECHO *Esc*[0;140;"EXIT";13p, where *Esc* is the Escape character.

Note that ANSI commands execute properly only if an ANSI.SYS driver is installed. If it's not already there, add the line DEVICE=C:\DOS\ANSI.SYS to your system's CONFIG.SYS file.

Q. *I've got a simple question. Can you tell me what "shadow RAM" is?*

NELSON MARK
TORONTO, ONTARIO, CANADA

A. *Shadow RAM* is regular extended memory that a 386- or 486-based system is using to hold a copy (hence the term *shadow*) of some or all of the code in its system BIOS (basic input/output system) and video BIOS ROM (read-only memory) chips. BIOS code contains the most basic routines for the hardware it controls and is used by the operating system to carry out requests from programs. Because ROMs that run fast enough to keep up with today's rapid systems are more expensive than fast RAM, shadowing slower ROMs allows manufacturers to keep system prices down without sacrificing speed.

You turn on or disable shadowing through the system's CMOS setup utility or by setting DIP switches on the motherboard. With shadowing enabled, the contents of selected ROMs are copied into RAM when you start the system. Because the operating system and applications expect to find BIOS and video ROMs at specific memory locations, shadow RAM is then remapped to take over the ROM addresses.

Total extended memory in your system is reduced by the amount used for shadowing (usually between 32K and 128K). If your system has only 1MB of RAM, you'll likely get better performance by disabling shadowing and using the memory for other purposes.

Q. *I would like a command that would enable my batch files to respond to user input. This seems like an important function, but I can't find it in any DOS manual. What's the secret?*

SELIM R. BENBADIS
BEACHWOOD, OHIO

A. DOS itself has no provision for user input to batch files. There are many commercial, shareware, and public domain utilities that will display the prompt of your choice, let the user press one key, and return the ASCII value of the key pressed as an errorlevel you can

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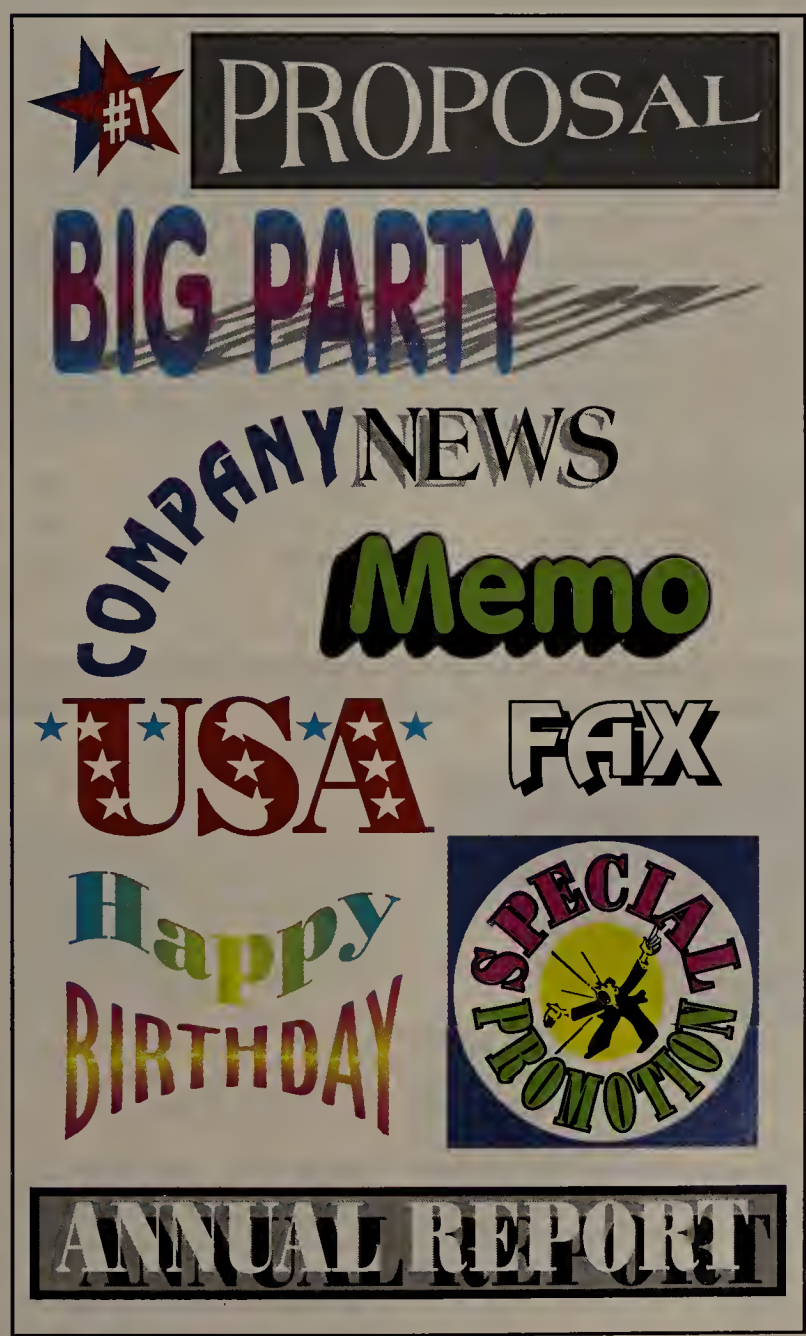

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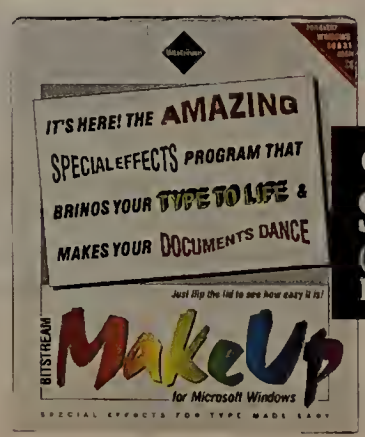

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use to control the batch file's next move. A more elegant solution is offered by BATCALL, a shareware utility that displays a prompt and lets the user type up to ten words, which it then returns to the batch file as separate arguments (%1, %2, and so on). BATCALL and a variety of one-key utilities are available for downloading from PC World Online as well as CompuServe and other BBS's.

WHERE TO BUY

BATCALL
Locksoft Inc.
P.O. Box 2660
Gaithersburg, MD 20886
800/562-5763, 301/258-9245
LIST PRICE: $13

Q. *I recently installed a ProAudio Spectrum soundboard and a Chinon CDS-431 CD ROM drive in my 16-MHz 286. My problem is that when I run multimedia CD ROMs like* Microsoft Bookshelf for Windows, *the sound plays a bit, then stops, plays a bit more, then stops again, and so on. Is there some way to make it play smoothly?*

JAMES CHIA
BEAU BASSIN, MAURITIUS

A. Try this: Open *Windows'* Control Panel, double-click on the Drivers icon, select *WaveAudio* at the bottom of the list of drivers, and click the *Setup* button. Adjust the scroll bar to increase the ProAudio's buffering to its maximum 9 seconds, then click the *OK* button. If this doesn't solve the problem, there's not much you can do short of upgrading to a faster system—a 286 isn't really fast enough to run multimedia software.

Q. *My AT&T PC6300's clock seems to stop at the end of 1991. Since the beginning of the year, I've had to fix the date manually every time I turn on my system. Is there some way to upgrade the computer to avoid this irritation?*

JOHN SHAHABIAN
SACRAMENTO, CALIFORNIA

A. Several utilities commonly available on BBS's can fix your 6300's clock problem. From the Help Screen section of the PC World Online Software Library, download ATTCLK.ZIP. On CompuServe, enter **GO IBMHW** and download ATTCLO.ARC from library #7. On other services, look for file names that start with ATTCL, such as ATTCLOCK.ZIP.

Karl Koessel is the technical editor and Robert Lauriston a contributing editor for PC World.

Mail your questions to The Help Screen, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Help Screen; CompuServe, 73707,1731; MCI Mail, 381-7106; Internet, duck@well.sf.ca.us; 415/442-1891 (fax). PC World pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

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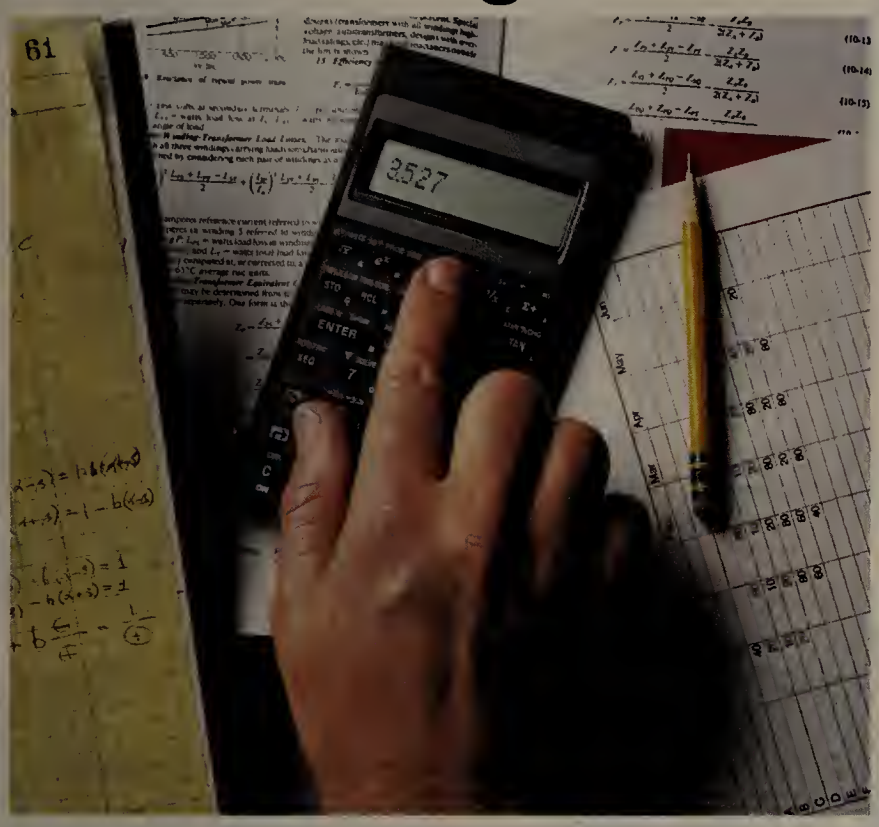

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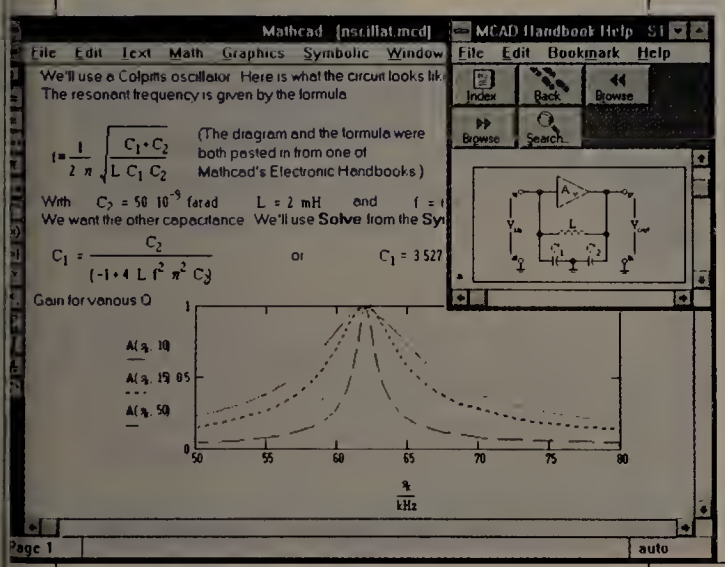

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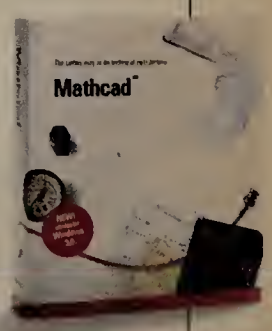

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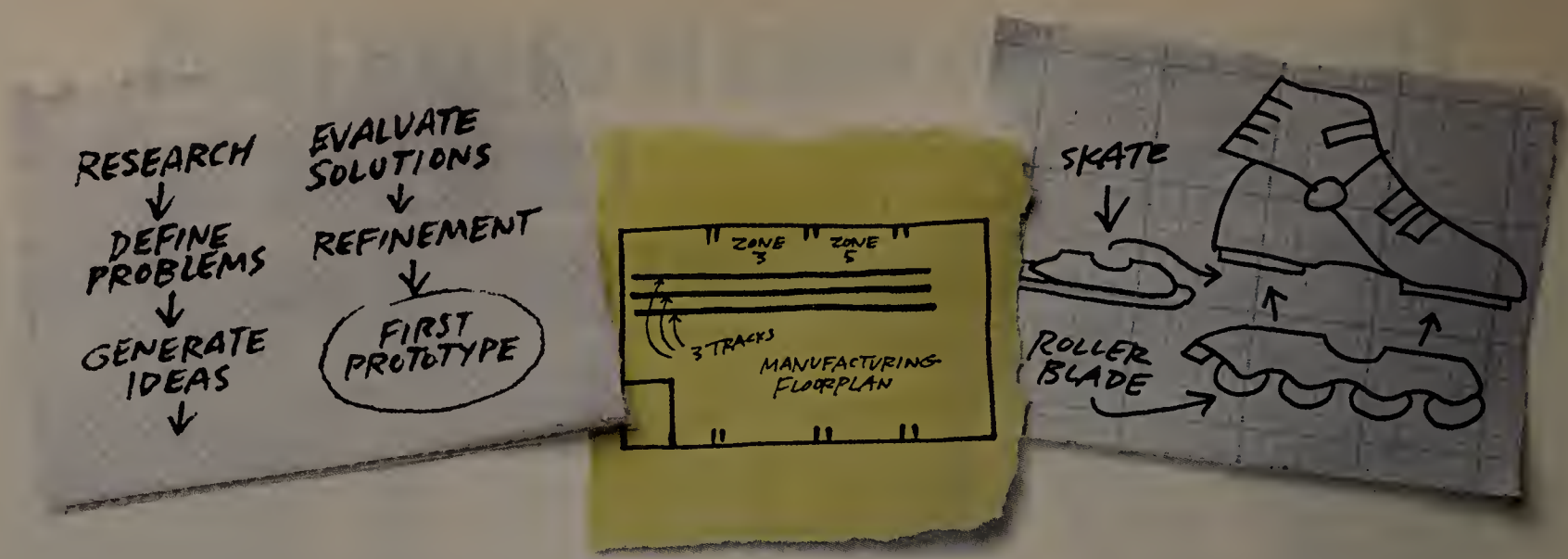

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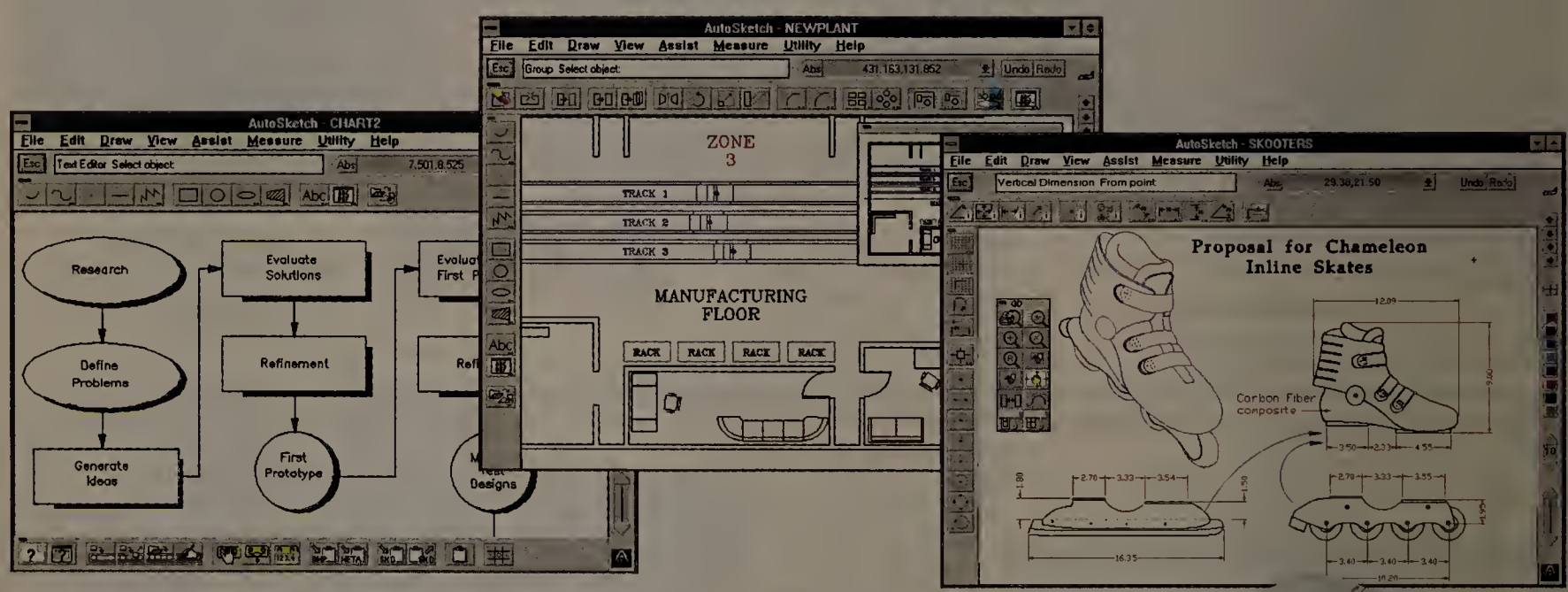

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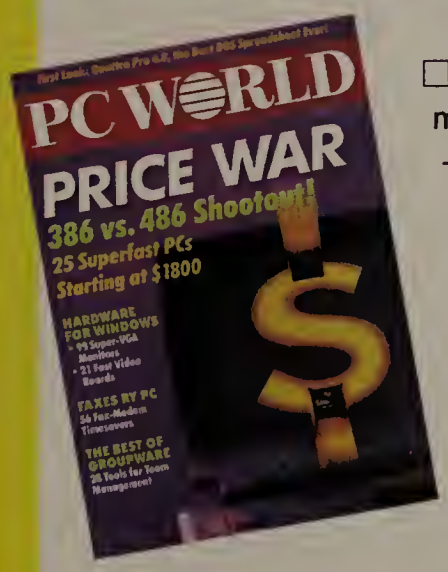

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WINDOWS WORKSHOP

BY SCOTT DUNN

Practical answers to your questions about Windows

Q. *I often use foreign characters in the documents I produce with my* Windows *word processor. The* Windows *manual tells me how to do this, but that method requires typing a four-digit number on the numeric keypad each time. I tried making a macro with Windows Recorder, but when I play it back, no character appears. What's wrong?*

MARIA ZAMBRANO
MIAMI, FLORIDA

A. *Windows* lets you access a variety of special characters from a list established by the American National Standards Institute (ANSI). Engage the **<Num Lock>** key, and while holding down the **<Alt>** key, type **0** plus the appropriate three-digit ANSI code on the numeric keypad. Useful combinations include **0169** for the copyright symbol (©), **0162** for the cent symbol, **0163** for the British pound symbol (£), **0146** for a true typographic apostrophe ('), **0147** and **0148** for true typographic quotation marks (" and "), **0151** for an em dash (—), **0174** for the registered trademark symbol (®), and so on. Common fractions (**0188** through **0190**) and, as you note, foreign characters are also available. A complete code list is found in the appendix of the *Windows* user guide.

The Recorder, which resides in the Accessories section, lets you assign the characters to easy keystrokes. But a bug prevents the Recorder from working in all applications; the recording goes okay, but playback seems to produce nothing. To overcome this glitch, open Recorder, choose *Macro • Run,* type the macro name, and select shortcut keys as prompted. Select *Start* to begin recording the macro, and in your word processor, enter the numbers as described in the preceding paragraph, followed by a space. Press **<Backspace>** to erase the space, then click the flashing Recorder icon and click *OK* to save the macro. Your macro should now function properly.

By the way, you can access the entire Greek alphabet and many other useful, if somewhat obscure, characters by using Symbol, a font that ships with *Windows.* Better yet, a fully scalable TrueType version of Symbol comes with *Windows 3.1.* And for an even more eclectic selection of characters—from the yin-yang symbol to an hourglass—*Windows 3.1* features a font called Wingdings.

Q. *I recently bought a new printer. When I opened the* Windows *Control Panel and clicked the* Add Printer *button to install the new driver, nothing happened. What's wrong? Is my Control Panel broken somehow?*

HAROLD LATTIMER
DETROIT

A. Chances are it's not the Control Panel that's corrupt, but your SETUP.INF file. That's where *Windows* lists installation options each time you run Windows Setup or, in this case, add a new printer. Some programs modify SETUP.INF and, in doing so, may cause problems.

Here's what to do. First, make a backup copy of the current SETUP.INF file; if another program modified it, you may need this copy later. You should find SETUP.INF in your \WINDOWS or \WINDOWS\SYSTEM directory.

Next, get out your original *Windows* disks and look for the SETUP.INF file on disk 1. Copy it over the existing SETUP.INF on your hard drive. Restart *Windows,* and the Add Printer button should function properly.

Q. *I like the new* Windows 3.1, *but when I minimize an application, the icon appears slightly above the bottom of the screen. To get the greatest use of my small screen, I have to move the icons down manually so I can still see them beneath my open windows, which occupy the upper portion of the screen. How can I get the minimized icons to scrunch down to the very bottom of my monitor?*

SHAWN HALL
BETHESDA, MARYLAND

A. To lower the bottom of the icon label on your monitor, you need to edit the WIN.INI file. First, make a backup copy of WIN.INI. Then, from Program Manager, select *File • Run,* and type **SYSEDIT** to launch the System Configuration Editor. Click on the WIN.INI window to bring it to the front, and search for the [Desktop] section. Underneath that heading, add the following line:

IconVerticalSpacing=60

Save the file, exit the System Configuration Editor, and restart *Windows.* You may need to experiment and change this number until you find the icon position that suits you best. If you use a very low number (say, less than 10) you can make the icon labels disappear at the bottom of the screen and view only the icon itself.

Note that once you have added this setting, selecting *Windows • Arrange Icons* or *Options • Auto Arrange* may cause the tops of some icons to run into

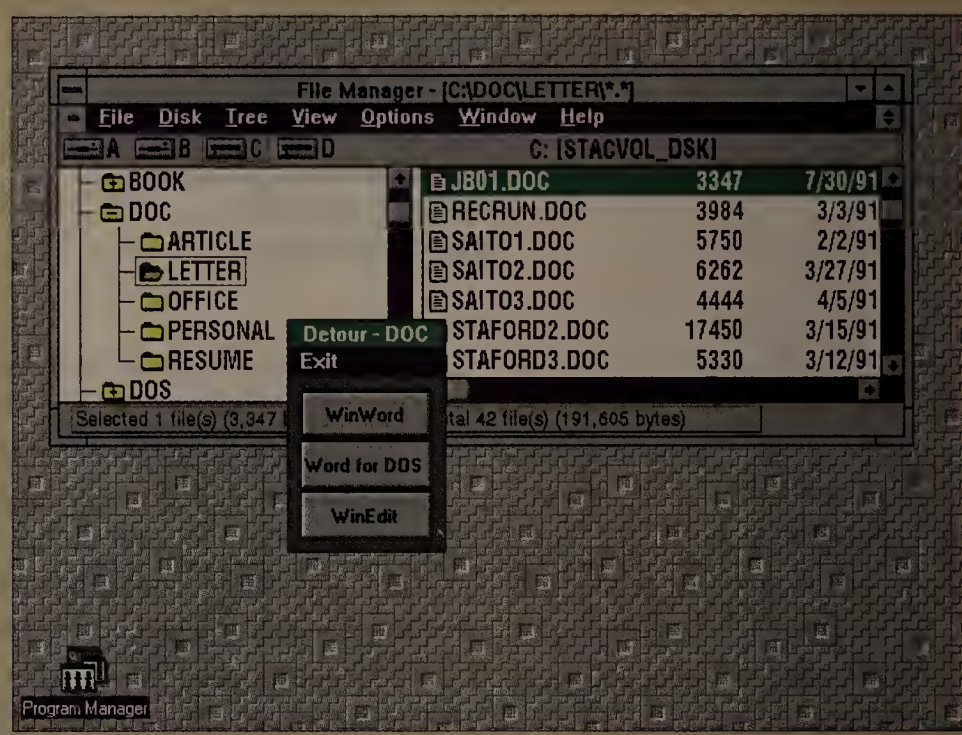
ANTHONY RUSSO

the labels of icons above them, especially if the labels are two lines deep. The solution: Arrange your Program Manager icons the way you want them *before* you edit WIN.INI. Make sure Auto Arrange is unchecked on the Options menu. Then adjust IconVerticalSpacing in WIN.INI, and thereafter avoid the Auto Arrange and Arrange Icons commands. If you need to rearrange Program Manager icons again, simply drag them into position.

In general, it's not a bad idea to rename your program labels to fit on a single line below your icons. To do this from Program Manager, click once on the icon in question and choose *File • Properties*. Change the Description line to something shorter, then click *OK*.

Here's another tip: To quickly size a program's window so it fills the space above your minimized icons, minimize all applications but one. Open Task Manager (double-click anywhere on the desktop or press <Ctrl>-<Tab>), and press <Alt>-<T>. This gives you the biggest possible window while letting you view all the icons at the bottom of your screen.

Windows Toolbox



Most *Windows* file managers let you associate the three-character extensions of data file names with a program's executable file so that double-clicking on a file name (say, FILE.TXT) launches the associated program (say, Notepad). But what if you use multiple programs to act on files with the same extension? *Detour* lets you do just that. Setup requires a little editing of the DETOUR.INI file and associating your data files with *Detour*. But once you've done this, you can, for example, double-click on any DOC file to display a button bar that lets you choose which word processor or text editor will load with the document. You can also choose between editing or launching a BAT file. It's a great convenience, and the price is unbeatable: free. *Detour* requires the *Visual Basic* DLL (VBRUN100.DLL); both are available on CompuServe in the WINADV and MSLANG forums, respectively.

Q. *I use* Ventura Publisher for GEM 3.0 *to produce a monthly company report, and I can't figure out how to bring an* Excel *chart into* Ventura. *Cut and paste doesn't work because the* GEM *version of* Ventura *doesn't support the* Windows *Clipboard. I have a PostScript printer, so ideally I'd import the image in EPS format, but* Excel *doesn't seem to support EPS. What would you suggest?*

JOSEPH COOPER
OMAHA

A. Your *Windows* PostScript printer driver lets you export any file in encapsulated PostScript (EPS) format. First, make sure your graphic is displayed in a window of its own (in *Excel* choose *File • New* and select *Chart* as the type). Then choose *File • Page Setup*, delete all text from the Header and Footer boxes, set all margins to zero, and select *Fit to Page* and *Portrait* orientation. (If you select *Landscape*, your graphic will come out rotated.) Then click *OK*. Next choose *File • Printer Setup*, select your PostScript printer, and click the *Setup* button. In the setup dialog box, click *Options*, and in that dialog box, select *Encapsulated PostScript File*. Don't bother to type in the file name yet. Click *OK* repeatedly to clear all dialog boxes. Now choose *File • Print* and click *OK*. You will be prompted for the Output File Name. Type in the path and name of the file, using the EPS extension.

You now have an EPS version of your *Excel* chart, ready to load into *Ventura Publisher* or another compatible application. (Some cropping may be necessary.) Before you print again, don't forget to return to the Printer Setup dialog box to change the Options setting back to Printer.

Mail your Windows *questions to* Windows Workshop, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Windows Workshop; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

Scott Dunn is the coauthor of 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).*

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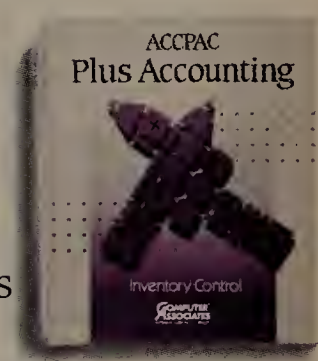

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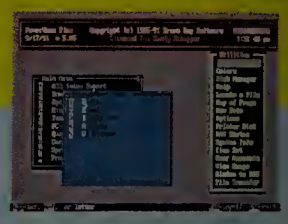

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PowerMenu Plus is a Menu System and File Manager for IBM-PC and compatible computers. Programs on your hard disk are automatically installed onto the colorful menus. Programs are run at the press of a single key. When you exit the program, you are returned to the menu. No need to learn "computerese." Powerful Disk Manager, Virus Detection/Removal, Modem Communications, File Transfer. Security, passwords, usage tracking and more! Brown Bag Software unconditionally guarantees your satisfaction. Impacts just 3K of RAM. LAN Versions available.

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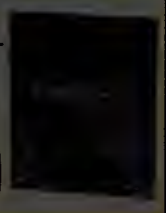

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USER GROUP TIPS

Helpful hints from members of the nation's user groups

The WordPerfect File

WordPerfect's familiar List Files screen, accessible by pressing <F5>, has a few tricks up its sleeve. For instance, have you ever marked files or used the Find command to narrow your file list, then accidentally pressed <Space> and found yourself back in your document? Just press <F5> twice to return to your last List Files screen—with all the markings and filters you'd set up before you left.

The same keystrokes you use to find text in a file double as a file finder on the List Files screen. Simply press **<F2>**, type in any part of the file name (you don't need wild cards), and press **<Enter>**. The highlight will go to the first file whose name contains the string. This is a true substring search, by the way; if you search for 'END', <F2> will locate LENDER.MEM, ENDRES.LTR, and YEAREND.BUD.

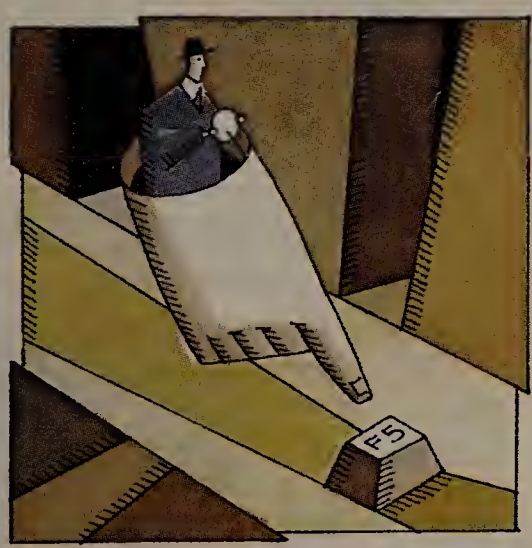
Also, you can bring up the List Files screen in many situations. For instance, you can press <F5> and get useful results selecting a primary or secondary file during a merge, importing or linking a spreadsheet, selecting a range from a spreadsheet, or retrieving graphics or equations. There's more to the List Files screen than meets the eye.

READ GILGEN
MADISON (WISCONSIN) PC USER'S GROUP

Batching the Warm Boot

Everyone knows how to warm boot a computer—press <Ctrl>-<Alt>-<Delete>, usually while cursing. But what if you want a batch file to warm boot your PC? For instance, if you prefer a different configuration for *Windows* than for DOS, you might want a batch file that copies your AUTOEXEC.WIN and CONFIG.WIN files to AUTOEXEC.BAT and CONFIG.SYS, then reboots. Such a file might look like this:

```
@ECHO OFF
ECHO WARNING! Computer reboots
ECHO Press <Ctrl>-C to abort
PAUSE
COPY AUTOEXEC.WIN AUTOEXEC.BAT
COPY CONFIG.WIN CONFIG.SYS
WARMBOOT
```



ROBIN JAREAUX

Now create the WARMBOOT program. Enter the following into an ASCII text file called WARMBOOT.SCR:

```
N WARMBOOT.COM
A 100
MOV BX,1234
MOV AX,40
MOV DS,AX
MOV [72],BX
JMP FFFF:0

RCX
11
W
Q
```

At the DOS prompt, run the command **DEBUG < WARMBOOT.SCR**. When you run the resulting 17-byte file, WARMBOOT.COM will boot your computer. Move it to a directory listed in your AUTOEXEC.BAT's PATH command.

OLAF MEDING
MADISON (WISCONSIN) PC USER'S GROUP

The Key to Quicken

Anyone who has tried to run a pop-up TSR like *SideKick* from inside *Quicken 5.0* has probably hit a snag. The home accounting program's control over keyboard interrupts is so complete the TSR doesn't know when its hot key is pressed, so it won't pop up. Utilities such as STACKEY—which let you stuff the keyboard buffer as you enter a program, automating the first "keystrokes" that affect a program when it's loaded—encounter similar difficulties.

For *Quicken 5.0* releases 6 and beyond, there's a cure. If you load *Quicken* with the command **QUICKEN /K**, it will use what's in the buffer and let TSRs know when they're being called.

KENNETH J. WARNOCK
OREGON COAST USERS GROUP

If you belong to a user group, submit tips to User Group Tips, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, User Group Tips; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax). Include your phone number and the name of your group. We pay $50 and throw in a* PC World *T-shirt for each tip we use. Sorry, we cannot acknowledge unpublished materials.*

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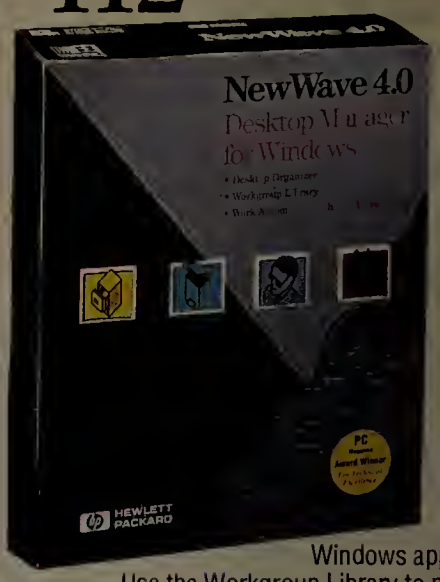

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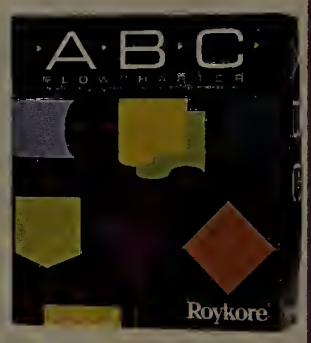
PC File 6.5
$84

This dBase compatible, non-programmable database includes many enhancements and a relational update feature. Version 6.5 is also 2-10 times faster than 6.0, includes bar code support, configurable table view and the ability to "post" data to other databases. You can also customize your database by defining fields, automatic data and editing masks, as well as customizing colors. ButtonWare #07763

ABC Flowcharter
MICROSOFT® WINDOWS™ $214



This flow diagram and organization chart program is specifically designed to take advantage of today's high-speed, graphics-based personal computers. ABC lets you create and edit charts in a fraction of the time. Requires Windows 2.1 or higher. Roykore #09311

SuperStor 2.0
$78

Running out of disk space can be frustrating. But with SuperStor 2.0 disk space becomes plentiful. This updated version makes it one of the fastest, most advanced data compression program software of its kind. Some of its new features include an Advanced Compression Utility Tool Kit that scans, checks and repairs data for optimal disk performance. SuperStor also has the highest compression ratio of any data compression software. Clear, colorful graphic displays make installing and using SuperStor simple as well. Runs with all popular operating systems and applications. AddStor #07743

Ken Griffey Jr. Card Collector
$44

This flexible software knows everything about cards, errors, rookies, multiple players, and teams. The Card Collector knows what end-users want, need, have and value. Officially licensed by all major card manufacturers. Collectors Series #07472 - 5.25" #07473 - 3.5"

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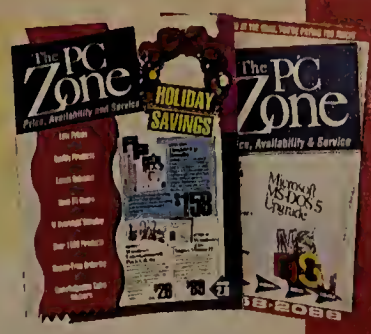

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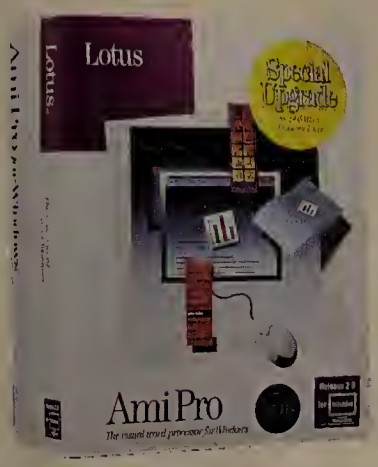

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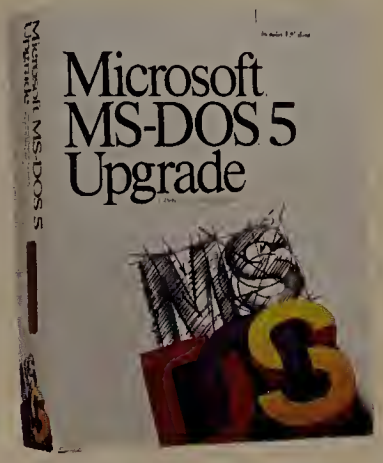

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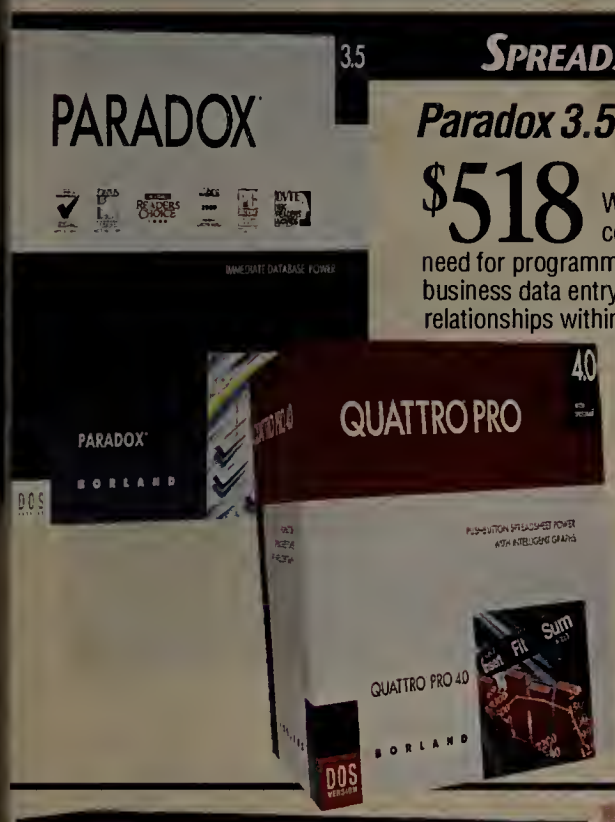

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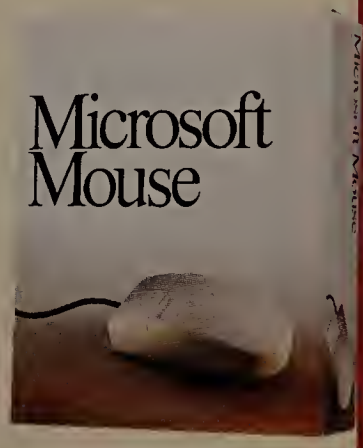

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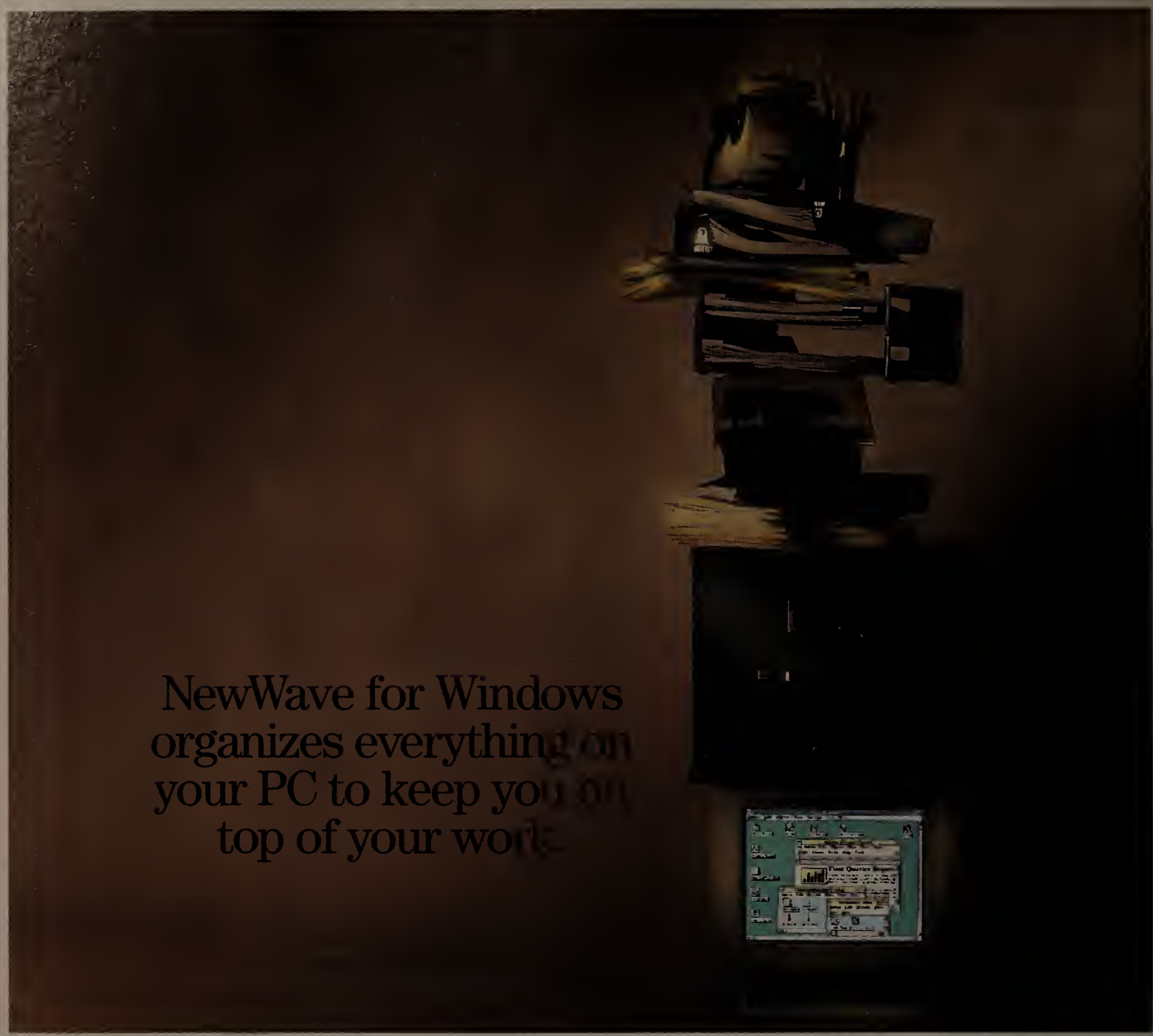

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STAR-DOT-STAR

EDITED BY BRETT GLASS

A global exchange of personal computer discoveries

Both Sides Now

I like to print *WordPerfect* documents on both sides of the paper. Not only does this save a lot of paper, but the result also takes up less storage space.

When you begin a print job from either the List Files screen or the Print screen's Multiple Pages option, *WordPerfect 5.0* and later versions ask you which pages you want to print. If you enter an 'E' or 'O' before the page number range, *WordPerfect* prints only the even- or odd-numbered pages.

To create double-sided output, print the even pages with your printer set to output faceup (on a LaserJet Series II, let down the output-tray selector, that is, the flap in the back). Then place the same paper—facedown and top up—in the paper tray, set the printer to print facedown (the default setting in most printers), and print the odd pages on the other side.

This technique requires you to specify a range of pages to print, but luckily *WordPerfect* can take an open-ended range for page numbers. For example, to print all the even pages in a document, enter **E1-** at the Page(s) prompt.

My macro [see **FIGURE 1**] prints the document in the current window, even pages first, then odd pages. To create it, press **<Home><Ctrl>-<F10>**, and at the Define Macro: prompt, enter **2SIDE**. At the Description: prompt, enter **Print on both sides of paper.**

Once inside the macro editor, press **<Delete>** to remove the '{DISPLAY OFF}' command (you don't want it here), and enter the commands and prompts as shown. To enter a {Print} command, press **<Shift>-<F7>**. For an {Enter} command, press **<Ctrl>-V<Enter>**. To insert the {BELL}, {PROMPT}, and {PAUSE} commands, press **<Ctrl>-<Page Up>** and select the needed command from the resulting pop-up menu. Type in the rest of the text directly, and don't forget the tilde (~) at the end of the third line. When you've entered the macro, press **<F7>** to save it. Now, any time you want to use both sides of the paper, just load the document you want to print, press **<Alt>-<F10>**, and enter **2SIDE** at the Macro prompt.

ALAN J. HAMPSON
APO AE

Editor's note: Besides coming in very handy if you need to print double-sided documents, this technique is useful if you're printing flyers that fold in thirds; each of the six "pages" becomes a column on one of the two sides.

One caveat if you're using letterhead or prepunched paper: Remember that this macro prints the back side of each page first (because page 1 faces forward). Also, if you have an odd number of pages, remember to add a blank page to the pile before you flip it over. Otherwise, your printer will run out of paper before it prints the last, single-sided page.

```
{Print}me1-{Enter}
{Print}
{BELL}{PROMPT}Reload paper and press enter~
{PAUSE}
mo1-{Enter}
```

FIGURE 1: This WordPerfect macro prints even pages first, then the odd ones, letting you use both sides of your paper when you print a document.

ANTHONY RUSSO

Climbing Directories Under NetWare

Most DOS users know that two consecutive periods (..) are recognized as an alias for the parent of the current directory. For example, ..\FILE1 refers to a file or directory called FILE1 in the current directory's parent.

In a network environment, directory structures are often deeply nested, and relative path names can get long and clumsy, as in ..\..\..\..\FILE2. In a Novell NetWare network, there's a useful shorthand for these long paths. Under NetWare, ... (three periods) is the equivalent of ..\.. (the directory two levels up); four dots go three levels up, and so on.

This solution works only for NetWare volumes, though. A DOS volume won't recognize more than two dots in a row.

GABI SHAHAR
HERZLIYYA, ISRAEL

Instant Edits

One thing that disappointed me about DOS 5.0's DOSSHELL program was the absence of a "File Edit" command that loads the editor program with the selected file. You could, of course, load the editor, then load the file into the editor, but if the file is already highlighted in DOSSHELL's file list, you shouldn't have to.

The solution I found is so simple, I am

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PC WORLD

amazed that it was not included in the initial setup. Within DOSSHELL, select *View • Program/File Lists*. Highlight Editor in the Main program group's list (but don't press <Enter>), then select *File • Properties* from the menu. When the resulting dialog box appears, press **<Tab>** to move to the Commands box. If the entry doesn't read 'EDIT %1', type it in. Then press **<Enter>**; this will bring you to another dialog box. Enter **%F** as the Default Parameter, and press **<Enter>**. Once you've completed these steps, whenever you activate the editor from DOSSHELL, it will assume you want to load the file that's currently selected in the file list.

R. C. KRULISH
HADLOCK, WASHINGTON

Editor's note: DOSSHELL contains all sorts of pleasant surprises, and this is one of the best of them. %F is one of two special default parameters; the other, %L (a percent sign followed by the letter L*), changes the file you last specified to the default.*

Reading Your ROM

If you're having a hardware or software problem with your system, you often need to know who made your BIOS and when they made it. Your manual should have this information, but it's not always there and not always easy to locate. The BIOS date is usually displayed when you boot up, but having to reboot to get this information makes little sense.

That's why I wrote ROMINFO.BAS [see **LISTING 1**], which displays the copyright notice, date, and machine ID type embedded in the ROM BIOS; and you don't have to reboot. ROMINFO also displays the probable type of system based on the machine ID byte.

ROMINFO.BAS is written for DOS 5.0's QBasic, but you can easily modify it for BASICA and GW-BASIC by replacing the SELECT...CASE statements with IF...THEN statements. The program looks for the ID byte at address F000:FFFE, the copyright notice start-

Laurence J. Pino, Esq.
Creator of The Desktop Lawyer

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ing at F000:0 (the beginning of the ROM BIOS), and the ROM date beginning at address F000:FFF5. These addresses are used by almost all major ROM manufacturers, although some, such as DTK, don't place copyright information at the beginning. In that case, all you see on the screen for that information is garbage characters, or nothing at all, depending on what happens to be at that address.

VINCENT D. O'CONNOR
BABBITT, MINNESOTA

Editor's note: This program will virtually always find the BIOS release date and the machine type, but the absence of the copyright notice is not necessarily the fault of the manufacturer. For instance, I use the QEMM-386 memory manager, which maps the F000:FFF5 area out of memory entirely. To read the copyright notice, I had to temporarily remove QEMM—a trick that may work for you if you have the same problem.

To create ROMINFO, copy **LISTING 1** *to an ASCII text file called ROMINFO.BAS. To run the program, enter the command* **QBASIC /RUN ROMINFO** *at the DOS prompt while in the same directory as ROMINFO.BAS.*

```
DEFINT A-Z
CLS
DEF SEG = &HF000
SystemID = PEEK(&HFFFE)
ROMDate$ = ""
Copyright$ = ""
FOR I = 0 TO 7
   ROMDate$ = ROMDate$ + CHR$(PEEK(&HFFF5 + I))
NEXT I
FOR I = 0 TO 100 STEP 2
   Copyright$ = Copyright$ + CHR$(PEEK(&H0 + I))
NEXT I
LOCATE 10, 1
PRINT "ROM date: "; ROMDate$
PRINT "Copyright notice: "; Copyright$
PRINT "System ID number: "; HEX$(SystemID)
PRINT "Type of system: ";
SELECT CASE SystemID
   CASE &HFF
      PRINT "IBM PC or PC clone"
   CASE &HFE
      PRINT "IBM XT, Portable PC or XT, or XT clone"
   CASE &HFD
      PRINT "PC Junior"
   CASE &HFC
      PRINT "AT, PS/2 Model 50/60, or AT/386 clone"
   CASE &HFB
      PRINT "IBM XT or XT clone"
   CASE &HFA
      PRINT "IBM PS/2 Model 25 or Model 30"
   CASE &HF9
      PRINT "IBM Convertible"
   CASE &HF8
      PRINT "IBM PS/2 Model 70 or 80"
   CASE ELSE
      PRINT "unlisted PC model"
END SELECT
SYSTEM
```

LISTING 1: Run this program through DOS 5.0's QBasic to see your ROM's copyright and date and the class of computer you own.

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Play INSTANT script	**<Alt>-<F4>**
Record script other than INSTANT	**<Alt>-<F10>B**eginRecord, type script name, **<Enter>**, do task, **<Alt>-<F10>E**nd–Record
Write script	**S**cripts•**E**ditor•**W**rite
Edit existing script	**S**cripts•**E**ditor•**E**dit
Play script	**<Alt>-<F10>P**lay
Debug script	**<Alt>-<F10>D**ebug
Save query to script	Create query, **<F10>S**cripts•**Q**uerySave, name query, **<Enter>**
Run PAL command(s) without creating script	**<Alt>-<F10>M**iniscript, type commands, **<Enter>**

Note: Miniscripts are limited to 175 characters.

Fold Here

COMMON TASKS

Task	PAL command	Keystroke or menu equivalent
Save current object and return to Main mode	DO_ITI	**<F2>**
Move cursor to image above	UPIMAGE	**<F3>**
Move cursor to image below	DOWNIMAGE	**<F4>**
Place example element in query	EXAMPLE	**<F5>**
Checkmark field in query	CHECK	**<F6>**
Toggle between form and table view	FORMKEY	**<F7>**
Print default report for current table	INSTANTREPORT	**<Alt>-<F7>**
Graph current table	GRAPHKEY	**<Ctrl>-<F7>**
Clear current image from work space	CLEARIMAGE	**<F8>**
Clear all images from work space	CLEARALL	**<Alt>-<F8>**
Enter Edit mode	EDITKEY	**<F9>**
Enter Coedit mode	COEDITKEY	**<Alt>-<F9>**
Display menu for current mode	MENU	**<F10>**
Search for field value	ZOOM	**<Ctrl>-<Z>**
Add data in table to another table	ADD *table1 table2*	**T**ools•**M**ore•**A**dd
Cancel edit session	CANCELEDIT	**C**ancel•**Y**es
Copy table to another table	COPY *table1 table2*	**T**ools•**C**opy•**T**able
Delete table and its family	DELETE *table*	**T**ools•**D**elete•**T**able
Empty all records from table	EMPTY *table*	**T**ools•**M**ore•**E**mpty
Pick form to display current table	PICKFORM n	**I**mage•**P**ickform
Play script	PLAY *script*	**S**cripts•**P**lay
Rename table	RENAME *table1 table2*	**T**ools•**R**ename•**T**able
View table on work space	VIEW *table*	**V**iew

COMMON TASKS (continued)

Task	PAL command	Keystroke or menu equivalent
Print report other than table's default	REPORT *table* n	**R**eport•**O**utput•**P**rinter
Change working directory	SETDIR *dirname*	**T**ools•**M**ore•**D**irectory
Sort table on field(s)	SORT *table* ON *fieldlist*	**M**odify•**S**ort
Exit *Paradox*	EXIT	**E**xit•**Y**es

FUNCTIONS

When passing parameters to commands and functions, you must put text strings, table names, and script names in quotes, as in **UPPER("John Smith")**, put field names in square brackets, as in **UPPER([Name])**, and use variable names directly, as in **UPPER(CurName)**.

Date Functions

Convert text string into date value	DATEVAL(*string*)
Get date's day number	DAY(*date*)
Get date's day of the week name	DOW(*date*)

Fold Here

Get date's month number	MONTH(*date*)
Get date's month name	MOY(*date*)
Get system date	TODAY()
Get date's year	YEAR(*date*)

Note: DATEVAL()'s parameter must be a text string or other text value in one of the accepted *Paradox* date formats—mm/dd/yy, dd-mon-yy, or dd.mm.yy, as in **DATEVAL("7/19/92")**. Functions that require a true date as a parameter can accept direct dates or the contents of date fields or variables, as in **DAY(7/19/54)** or **DOW([DueDate])**.

Table and Field Information

Get name of current field	FIELD()
See if table is empty	ISEMPTY(*table*)
Get number of records in table	NRECORDS(*table*)
Get current record number	RECNO()
Get current table's name	TABLE()

Mathematical and Statistical Functions

Get absolute value	ABS(*number*)
Get field's average value	CAVERAGE(*table*, *field*)
Get field's largest value	CMAX(*table*, *field*)
Get field's smallest value	CMIN(*table*, *field*)
Get sum of field's values	CSUM(*table*, *field*)
Round number to n decimal places	ROUND(*number*, n)

CURSOR MOVEMENT COMMANDS

Move cursor to field, table, or record number	MOVETO [*table->field*] or MOVETO RECORD n
Move cursor to first record with specified value(s) in current field	LOCATE *value*

Note: You can also use commands like HOME and PGDN to move the cursor.

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PC WORLD

Instant Reference Card #26

For use with PC World Instant Reference Card Portfolio

ADVANCED: PARADOX APPLICATION LANGUAGE (PAL)

SCREEN PAINTING COMMANDS

Clear screen	CLEAR
Position cursor at desired screen location	@ *row, column*
Display information starting at cursor	?? *expression*
Display information starting at line below cursor	? *expression*
Display message in screen's lower right corner	MESSAGE *expression*
Display information on top two screen lines	PROMPT *expression1*, *expression2*
Display text block	TEXT *text* ENDTEXT

USER INTERACTION COMMANDS

Assign user-entered value to variable	ACCEPT *datatype* TO *variable*
Display menu, assign choice to variable	SHOWMENU *options : descriptions* TO *choice*
Wait in field [or record or table] until specified keypress(es)	WAIT FIELD [or RECORD or TABLE] PROMPT *text* UNTIL *keynames*

Note: See the sample script for an example of how to use the SHOWMENU command. You can also use GETCHAR() to make *Paradox* wait for user input.

PROGRAM FLOW COMMANDS

Execute command(s) if condition true	IF *condition* THEN *command(s)* ENDIF
Repeat command(s) until condition false	WHILE *condition* *command(s)* ENDWHILE
Repeat command(s) n times	FOR *variable* FROM 1 TO n *command(s)* ENDFOR
Go to top of WHILE, FOR, or SCAN loop	LOOP
Execute command(s) on current table's records	SCAN *command(s)* ENDSCAN
Execute command(s) on current table's records that meet condition	SCAN FOR *condition* *command(s)* ENDSCAN
Execute commands associated with one of multiple options	SWITCH CASE *condition : commands* ENDSWITCH
Quit current loop	QUITLOOP
Quit current script	QUIT

Note: See the sample script for an example of how to use the WHILE and SWITCH commands.

OTHER COMMANDS

Assign value to variable	*variable* = *value*
Assign value to field	[*fieldname*] = *value*
Suspend *Paradox* to run DOS command or program	RUN *command*
Assign PAL command to key	SETKEY "*keyname*" *commands*
Stop script play for n milliseconds	SLEEP n

FUNCTIONS

Data Functions

See if variable is assigned	ISASSIGNED(*variable*)
See if field is blank	ISBLANK([*field*])
Get length of expression	LEN(*expression*)
Convert expression to uppercase	UPPER(*expression*)
Convert expression to lowercase	LOWER(*expression*)
Convert number or date into text string	STRVAL(*expression*)
Get piece of text string	SUBSTR(*textstring*, *starting position*, *length*)
Get data type of expression	TYPE(*expression*)

System Functions

Get name of current directory	DIRECTORY()
Get amount of space left on drive	DRIVESPACE("*letter*")
See if drive has disk ready	DRIVESTATUS("*letter*")
See if file exists	ISFILE("*name*")
See amount of free memory	MEMLEFT()
See if printer is ready	PRINTERSTATUS()
Get name of private directory	PRIVDIR()

SAMPLE SCRIPT

This PAL script demonstrates how to use WHILE, SHOWMENU, SWITCH, WAIT, and PLAY. The PLAY command as shown requires another script called REPORT.SC.

```
WHILE True
  CLEAR
  CLEARALL
    SHOWMENU
      "Cust"    : "Edit customer information",
      "Report"  : "Generate reports",
      "Leave"   : "Quit program"
    TO choice
  SWITCH
  CASE choice = "Cust" : EDIT "Customer"
                         WAIT TABLE
                          PROMPT "Press F2 when done"
                         UNTIL "F2"
                         DO_IT!
  CASE choice = "Report"   : PLAY "Report"
  CASE choice = "Leave"
    OR choice = "Esc"      : QUIT
  ENDSWITCH
ENDWHILE
```

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```
; "SETKEYS.SC" BY D. HEMACHANDRA

SETKEY -31 RETURN FORMAT ("W20.2,EC",IMAGECSUM())          ;ALT S to sum a column
SETKEY -49 RETURN FORMAT ("W20.2,EC",IMAGECMIN())          ;ALT N for the minimum value
SETKEY -50 RETURN FORMAT ("W20.2,EC",IMAGECMAX())          ;ALT M for the maximum value
SETKEY -30 RETURN FORMAT ("W20.2,EC",IMAGECAVERAGE())      ;ALT A for the column average
```

LISTING 2: Use this Paradox PAL script to put summary functions, which return values for numeric columns, at your fingertips.

Superfast Summaries in Paradox

It's easy to obtain summary information such as column totals—*without* creating a query—in *Paradox 3.*x. For example, the IMAGECSUM() function displays the total of any numeric column. To use this function, place the cursor on a column that you want to total and press **<Alt>-<F10>**. Select *Value* in the resulting menu, type **IMAGECSUM()**, and press **<Enter>**. The result is displayed in the message window at the bottom right of the screen. You can use other functions to display minimums, maximums, averages, and counts.

This method has several advantages over querying. It's faster, because you don't need to create a query form and type in the requirements. It's also more flexible, since IMAGE functions can be used in tables or forms, or even in linked or unlinked multitable forms.

To make these functions even easier to use, you can assign them to key combinations. The PAL script [shown in **LISTING 2**] assigns summary functions to specific keys. Once you've run the script, press **<Alt>-S** to get a sum of the current field's values, **<Alt>-N** to get the smallest value in the field, **<Alt>-M** the largest, and **<Alt>-A** the average. All four commands use the FORMAT() function to display every answer to two decimal places. Each of these functions displays an error message if you use it on a nonnumeric column or when there aren't any columns.

You can create this script or one like it in *Paradox*'s own or any other text editor. Whatever name you give it, the extension must be SC, a detail that the *Paradox* editor handles for you. If you name the script INIT.SC, the keys are assigned automatically each time *Paradox* is started (if you already have an INIT.SC file, you may prefer to add these lines to it rather than create a new script). If you name the script something other than INIT—I call it SETKEYS—you can assign the keys by playing the script via the Script Play command. (See Chapter 3 of the PAL user guide for information on the codes for assigning keys.)

D. HEMACHANDRA
SEATTLE, WASHINGTON

Editor's note: Ruth Anne Ladue, my resident Paradox *expert, informs me that the FORMAT portion of each script (which determines how the result is displayed) can be changed to display data in almost any format you choose. 'W20.2,EC' means a field 20 spaces wide with two decimal places; the 'EC' puts a comma between every three digits. Without the FORMAT() function, each script prints the number using the default field width in* Paradox*—a good choice if the values in that column represent something other than dollars and cents.*

A CD ROM With Less RAM

If you've recently purchased the BSR external CD drive kit from DAK, you'll find no mention of a special switch for MSCDEX, the Microsoft CD ROM Extensions RAM-resident program, that frees up some of your precious conventional RAM. If you load MSCDEX with the command MSCDEX /E, the program stores approximately one-half of its code out of the way in expanded memory.

The amount of conventional RAM available on my 386SX (running DR DOS 6.0) went from 616K down to 557K using DAK's recommended install process. The addition of the /E switch brought me back up to 574K. Going a step further, I HILOADed the entire MSCDEX line (with the /E switch) and came right back up to 616K.

FRANK RUNNER
NAPERVILLE, ILLINOIS

Editor's note: The /E switch is a valuable thing to know about, and it works for all CD ROM drives that come with the Microsoft extensions. If you have MS-DOS 5.0, you can use LOADHIGH to load MSCDEX high, just as Mr. Runner did with HILOAD under DR DOS. Third-party memory managers have their own, similar programs. Of course, you'll need some expanded memory in your system in order to take advantage of this special feature.

Only one caveat is in order for this tip. TSRs and drivers that use expanded memory sometimes fail to work properly with Windows *when it's running in 386 enhanced mode. If your system fails under* Windows, *you may have to stop using the /E switch.*

Have a macro, batch file, short program, or general tip you're proud of? Mail your tips to Star-Dot-Star, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Star-Dot-Star; CompuServe, 74055,412; MCI Mail, PC World Editorial; Internet, rogue@well.sf.ca.us; or 415/442-1891 (fax).* PC World *pays $25 to $200 for each tip used. Sorry, we cannot acknowledge unpublished materials.*

Brett Glass is a contributing editor for PC World.

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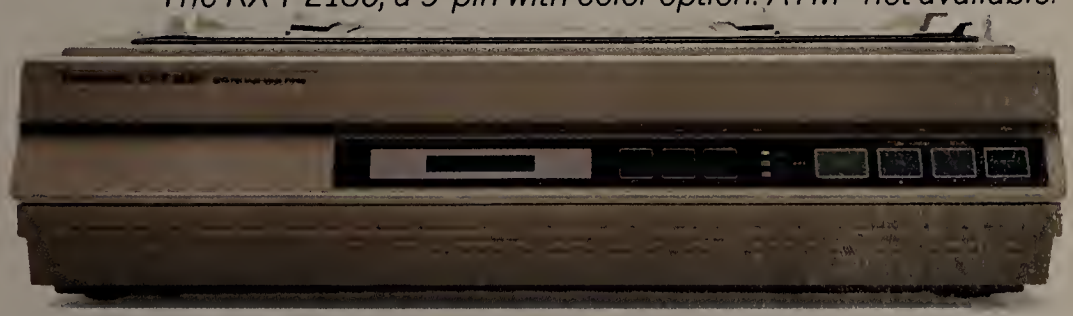

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Hardware Compatibility	◒	●	◒	◒	●	◒
Reliability	?	◒	?	◒	●	?
Ease of Use	◒	●	◒	●	●	◒
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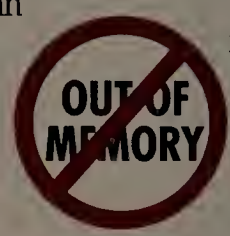

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What Next? (page 45)	○	○	○	○	○	○	○
Tap of the News (page 46)	○	○	○	○	○	○	○
Dell 320LSi: The Lightest Notebook Yet (page 48)	○	○	○	○	○	○	○
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OS/2: A Better DOS Than DOS? (page 107)	○	○	○	○	○	○	○
Forecasting Software (page 118)	○	○	○	○	○	○	○
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Processor type and speed

○ 286	○ 10/12 MHz
○ 386SX	○ 16 MHz
○ 386	○ 20 MHz
○ 486SX	○ 25 MHz
○ 486DX	○ 33 MHz
○ 486DX2	○ 50 MHz

Are you running *Windows?*

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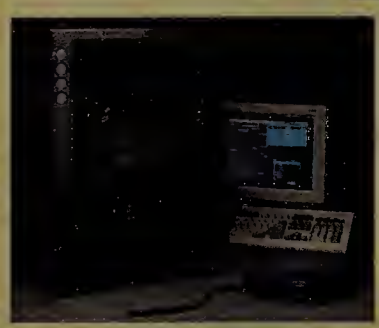

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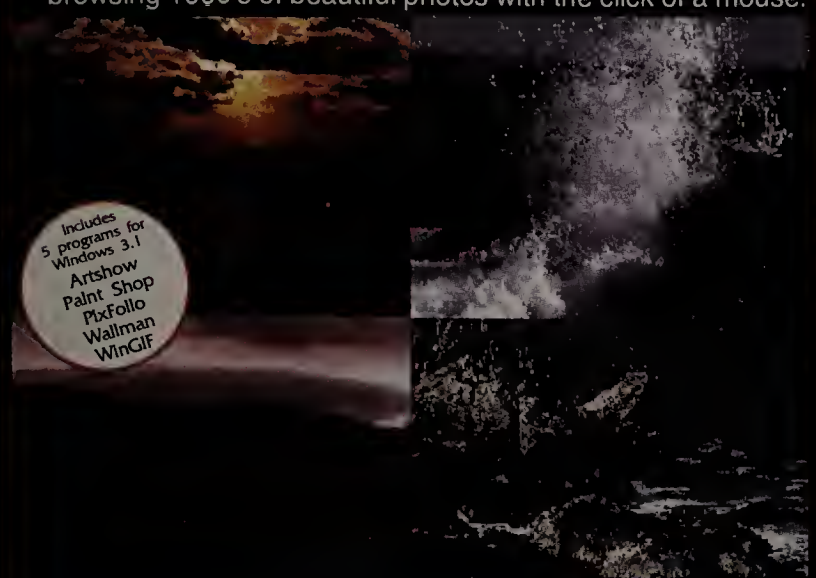

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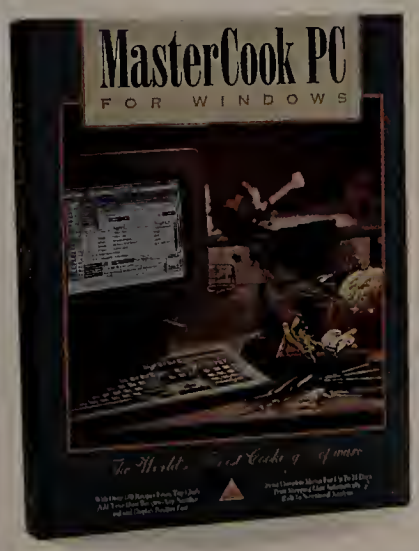

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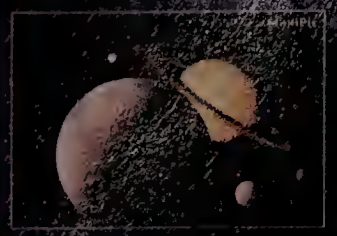

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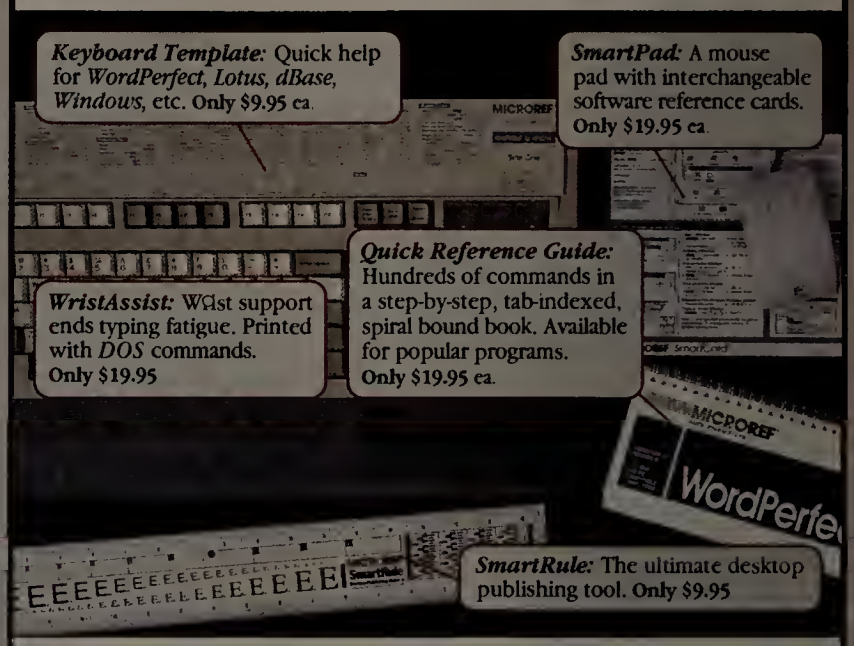

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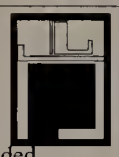

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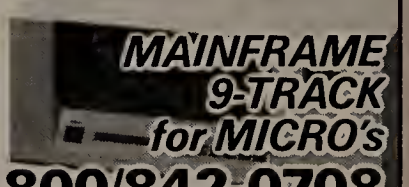

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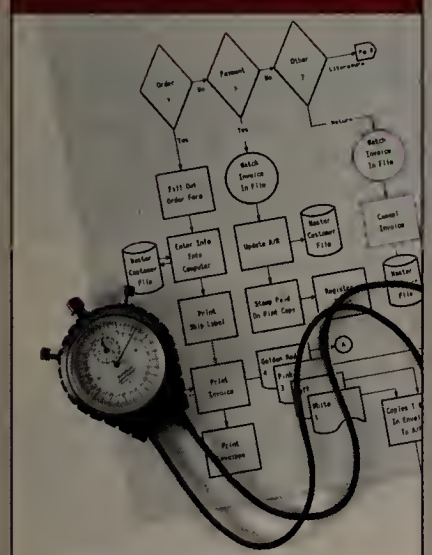

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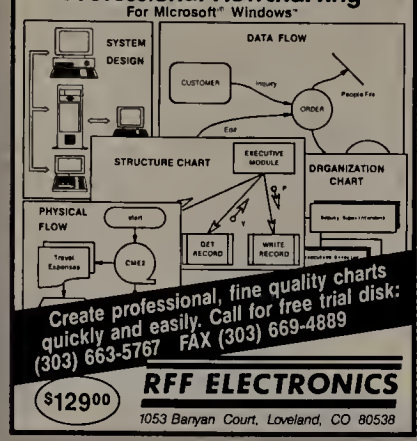

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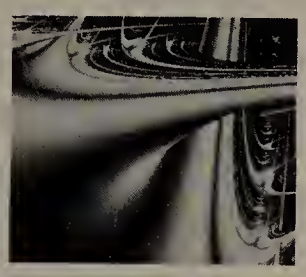

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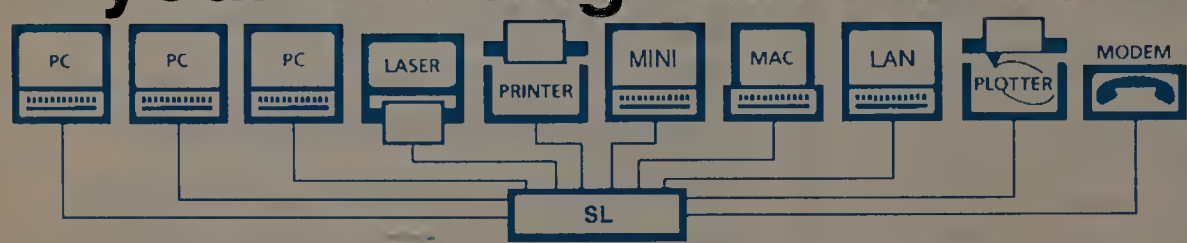

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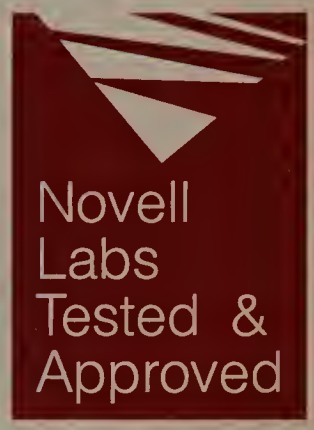

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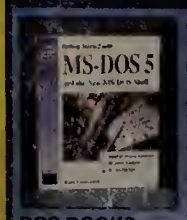

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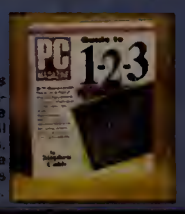

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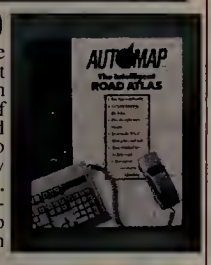

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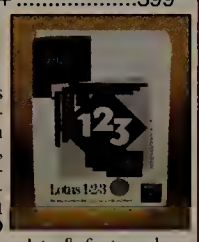

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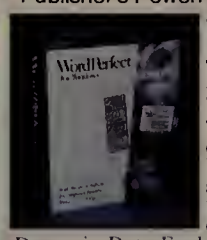

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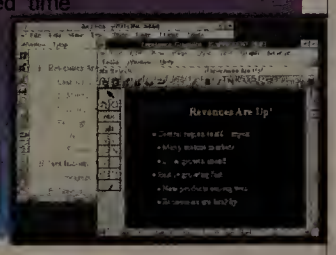

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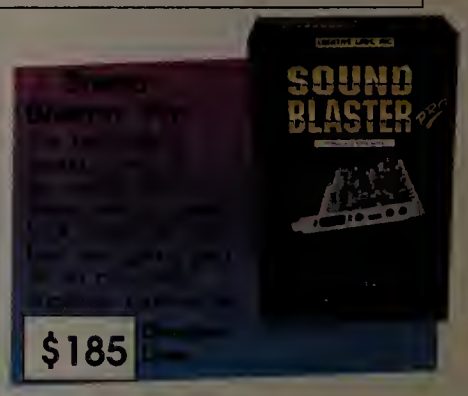

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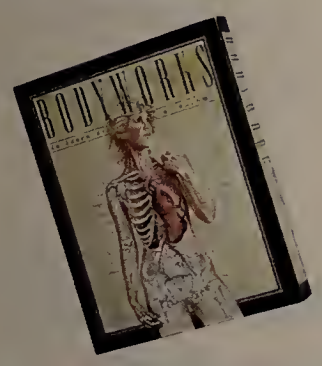

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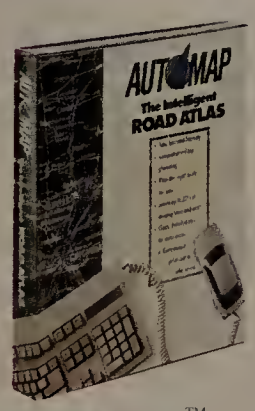

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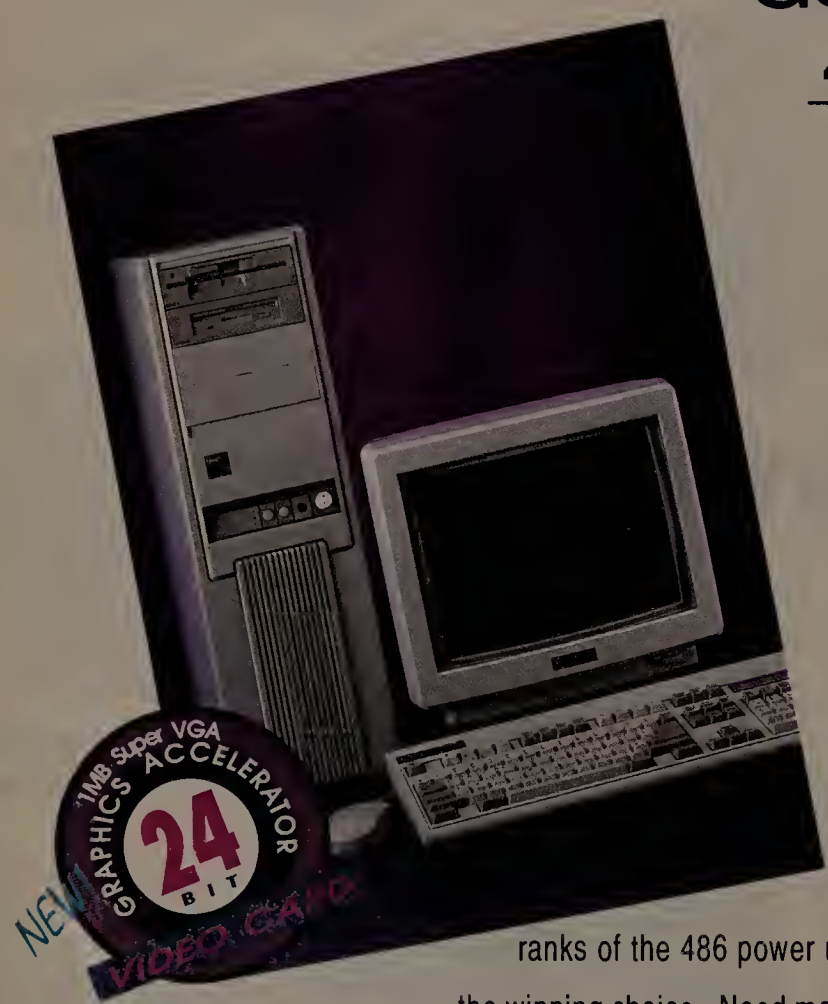

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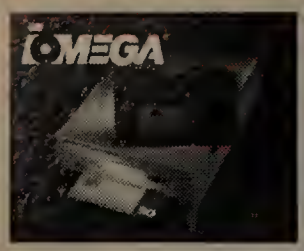

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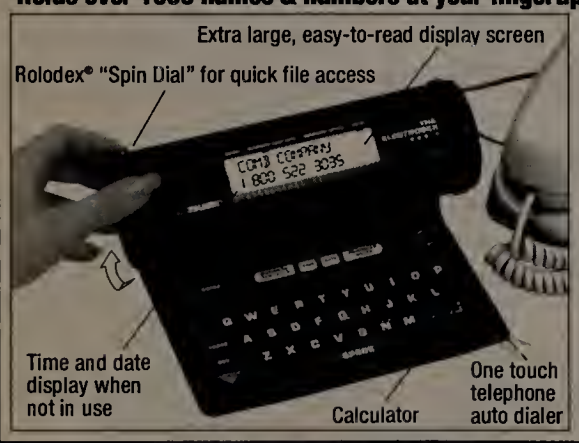

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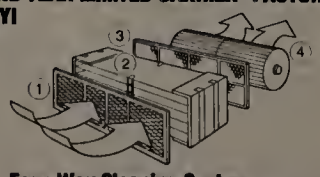

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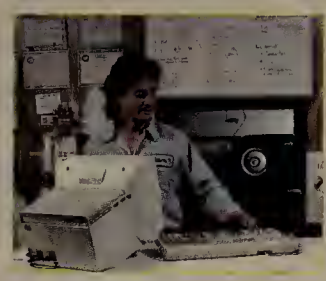

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THE HOME OFFICE

BY STEVE BASS

The practical guide to home/office computing

As a staunch DOS user, I didn't want to miss the boat. It seemed like everyone was going to *Windows* so I made the switch.

It hasn't been easy, but along the way, I've found some tricks to ease the transition. I can now exploit the richness of *Windows* applications such as *Ami Pro, Excel,* and *CorelDraw*—the environment's true value—without giving up my trusty DOS prompt.

Once I got up and running, I realized my hand spent too much time jumping over to the mouse. As a keyboard user, I found it more than inconvenient: It was costing time. Even Bill Gates predicts mice will disappear, to be replaced by keyboard pointing devices. Meanwhile, I've found ways to minimize my use of the mouse.

I started by ignoring it and using keyboard substitutes—combinations involving <Alt>, <Ctrl>, <Tab>, and <Esc>. I found a dozen shortcuts. For example, from an application window, <Alt>-<Space> pulls down the control menu, where I can minimize, mark, and paste; change fonts; or get to the task list. By holding down <Alt> and tapping <Tab> repeatedly, I can use *Windows'* new Coolswitch feature to cycle the names of my open applications within a little billboard. Releasing <Alt> puts me in an application, and <Alt>-<Esc> gets me back to my original application.

I found another gem in Brian Livingston's *Windows 3.1 Secrets:* <Alt>-<Enter> lets me toggle a DOS program back and forth between the full screen and a small window.

ANTHONY RUSSO

Getting rid of the mouse entirely was easier than I thought. Softac's *K-U-I* (*Keyboard User Interface*) is designed for mouseless *Windows* users—like when I'm stuck using a notebook in a cramped airline seat.

It does everything a mouse does, and more. The arrow keys provide me with up and down movement while <Home>, <End>, <Page Up>, and <Page Down> let me maneuver the cursor

BETHANY GULLY

diagonally. Holding down <Shift> lets me move one pixel at a time, and two taps on <Scroll Lock> centers the cursor midscreen.

I also can change the size and color of my cursor—for example, turning it into a box that magnifies whatever is beneath it 200 percent. That's particularly useful on a high-res monitor.

What's even better, *K-U-I* lets me quickly change programs or launch new ones by assigning instant hot keys to <Alt>-, <Shift>-, and <Ctrl>-*key* combos. It's much easier to access, change, and suspend my shortcut key combinations than in native *Windows.*

I like the convenience and comfort of a C: prompt because doing a DIR or COPY in *Windows* takes an act of Congress. On the other hand, keeping a DOS window open strains *Windows* resources. *K-U-I*'s Command Line Interface box gives me direct access to DOS without using any resources until accessed. Better still, I get a history of my ten most recent commands.

Even with these shortcuts, it could still take six keystrokes to get to a new subdirectory in *Windows. WINCD,* a free utility available through PC World on America Online, lets me quickly jump to a new subdirectory, run a program, and jump to another, while listing the last six I've been working in for quick return to any of them.

With the right tools—and attitude—even we recalcitrant DOS users can make the switch to *Windows.*

Contributing Editor Steve Bass is a family therapist and president of Pasadena IBM Users Group. He can be reached on PC World Online (see page 8 for more information).

WHERE TO BUY

K-U-I $79.95, Softac Corp., 800/433-0486, 617/721-1010
Reader service no. 601

Windows 3.1 $149, Microsoft Corp., 800/642-7676
Reader service no. 602

WINCD America Online, 800/827-6364 ext. 5741

Windows 3.1 Secrets Brian Livingston, IDG Books Worldwide, Inc., 1992
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Black and White	Color VGA Display
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4 MB RAM, 80 MB HD	4 MB RAM, 80 MB HD
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5.9 lbs w/battery	7.1 lbs w/battery
Return to dealer for service.	On-site lapside service.

†Source: Toshiba suggested retail price as of 5/5/92.

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